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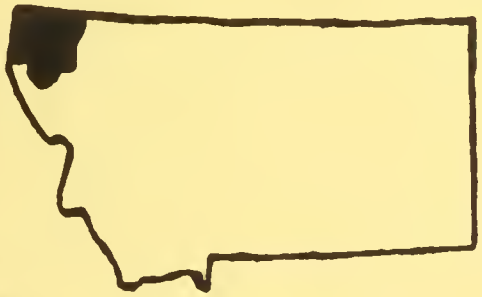
WATER QUALITY INVENTORY AND MANAGEMENT PLAN

KOOTENAI RIVER BASIN
MONTANA



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WATER QUALITY INVENTORY AND MANAGEMENT PLAN
KOOTENAI RIVER BASIN, MONTANA

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DECEMBER, 1974

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CHANGES MADE FROM DRAFT MANAGEMENT PLAN

PAGE	CHANGE
Table of Contents	Appendix III & Table 9 information changed
3	Paragraph 2, (Ref. 6, 7) changed to (Ref. 6, 7, 39)
17	Paragraph 4, Disinfection information, St. Regis Paper Co., reworded
18	Table 3, twenty changes, stream classifications indicated, MPDES permit numbers added, and several wording changes
21	Paragraph added on sludge disposal-bottom of page
28	First paragraph changed to give general statement of water quality
32	Table 9 title changed
35	Portions of paragraph 4 deleted
37	Page completely revised
38	Page completely revised. Now includes MPDES permit information including time schedules
41	Segments ranked according to water quality needs
43	Future planning and funding needs discussed
45	Discussion added; degree of treatment necessary to meet water quality standards
46	Paragraph and table added regarding municipal grant priority system
Appendix II	Revised water quality standards have been substituted for original standards which appeared in draft plan
Appendix III	New appendix added to plan includes minutes of public meeting as advertised

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WATER QUALITY INVENTORY AND MANAGEMENT PLAN

KOOTENAI RIVER BASIN, MONTANA

I. INTRODUCTION

This report presents information relative to water quality and water quality management in the Kootenai River basin (Figure 1). This is one of sixteen basins designated by the state of Montana for preparation of water quality management plans. The Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500) have directed states to prepare such plans as part of a nation-wide program for controlling water pollution. The objectives of this effort are to provide the state with water quality data and related information to (1) determine the water quality characteristics of all natural and waste waters, (2) determine what factors, both natural and man-made, affect the quality of waters, (3) develop a management strategy for maintaining and enhancing the quality of waters in the Kootenai River basin, and (4) provide information needed to determine whether Montana's water quality standards are and will continue to be met. Also included is a description of physical characteristics of the basin. The general methodology used in this study was the compilation and evaluation of existing water quality data and related information. Where information was deficient, field investigations and water and wastewater sampling and analysis were completed to obtain the needed information.

This investigation does not present a detailed analysis of the area's resources but summarizes water quality related information. As additional information becomes available, the Kootenai River basin water quality management plan will be revised and updated as part of Montana's Continuing Planning Process.

Assistance in obtaining information for this report was obtained from a number of agencies and persons. The Montana Department of Natural Resources provided information on land use, water use, economy and population.

SUMMARY AND CONCLUSIONS

In the Kootenai River drainage basin, there are four municipal and one industrial discharges plus one non-discharging municipal system. One additional federal sewage system is under construction and will have a discharge. All discharges will eventually be controlled under the joint state-federal discharge permit system, but at present, only two municipal and one industrial state permits are in effect. No federal NPDES permits are in effect in the Kootenai basin at this time. Federal compliance schedules have been established for three municipal and one industrial dischargers, best practicable treatment being required for industrial dischargers and secondary treatment being required of municipal dischargers by July 1, 1977.

Water quality in the Kootenai River drainage basin is generally excellent, as is typical of rural mountain stream systems. Two sewage treatment plants in the basin presently provide only primary treatment and are scheduled to upgrade to secondary treatment. The single industrial discharger will be upgrading treatment as well. When these improvements are completed, it is anticipated that all waters in the Kootenai basin, except the mainstem Kootenai River, will meet state water quality standards.

The Kootenai River is the exception. Two types of water quality problems occur in the stream. Canadian industrial discharges cause elevated nutrient levels in the Kootenai River, particularly phosphorus. Algal blooms in Koocanusa Reservoir are a distinct possibility in the future, although Canadian industrial controls on nutrient loads to the Kootenai are being implemented. Another water quality problem in the Kootenai River is nitrogen supersaturation resulting from operation of Libby Dam. This supersaturation violates Montana Water Quality Standards for the Kootenai River on a continuous basis from Libby Dam to the Montana-Idaho border. As a result, this segment of the Kootenai River is redesignated as a water quality limited segment. No waste load allocation was written for this segment, however, as Libby Dam is the only known artificial source of nitrogen (air) gas in the system.

Municipal facilities investments needed to achieve secondary levels of treatment for public sewage facilities in the basin are estimated at approximately $2,000,000.

A surveillance plan for continued monitoring of water quality in the Kootenai basin is described in this plan.

II. RELATED INVESTIGATIONS & PLANS

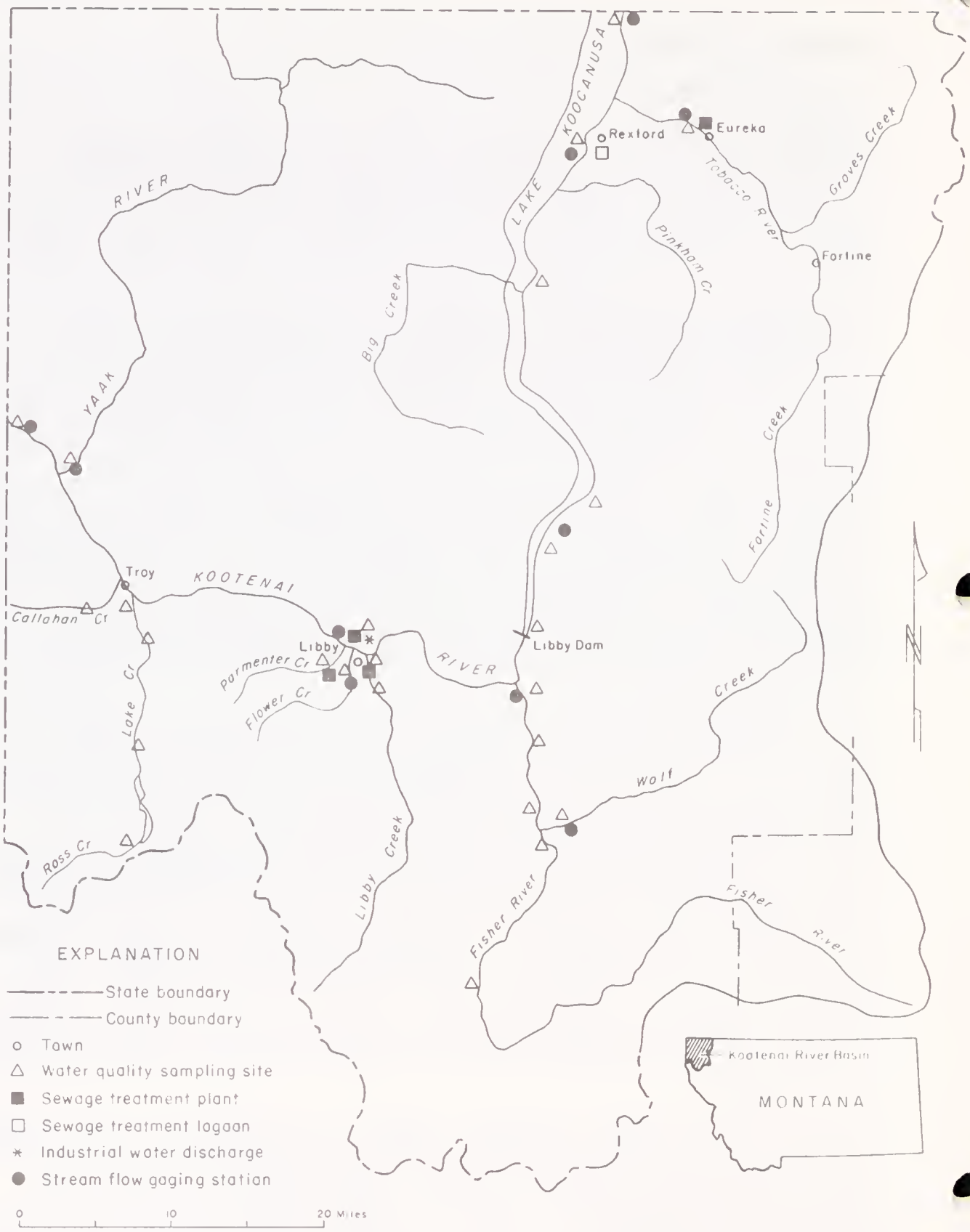
Technical Investigations

Two apparently unpublished reports, presumably of government origin, are available, documenting the effects of two major industrial discharges to the Kootenai system in Canada. The first, by D. C. Sinclair (Ref. 4, May, 1966) documents the effects of the COMINCO copper flotation mill on fish in the St. Mary's River, a Canadian tributary to the Kootenai. The other, by an unknown author (Ref. 5) establishes base level water quality data preceding the construction of Crestbrook Forest Products pump mill. The first study showed clearly that the COMINCO discharge had a very substantial effect on fish and bottom organisms in the St. Mary's River, but the effects were less obvious downstream in the Kootenai River. Water Quality data included in the report indicated a substantial effect on the calcium, iron, nitrate, sulphate, phosphate, hardness, and fluoride concentrations in downstream Kootenai River. Iron, nitrate, sulphate, phosphate, and fluoride measurements showed high to very high concentrations. These values were measured approximately 45 miles upstream of the U.S. (Montana) border. Phosphate in the Kootenai River was as high as that in many raw sewage sources. The present status of the COMINCO discharges is discussed in Sections VII and IX of this plan. Northcote (Ref. 18), in an extensive lakes study in the Kootenai basin, attributed much of the eutrophication in British Columbia's Kootenay Lake to the phosphate discharges to the Kootenay River some 400 kilometers upstream. Phosphate must travel from Canada, through the Kootenai system in Montana, and back into Canada to reach Kootenay Lake. Thus eutrophication of Koocanusa Reservoir in Montana is a definite possibility.

Literally dozens of reports, plans, bid invitations and contracts have been developed by the U. S. Corps of Engineers relative to the planning and construction of Libby Dam and the resulting Lake Koocanusa. A few of these reports are of special interest to the water quality management plan. The Corps of Engineers conducted pre-reservoir water quality investigations (Ref. 6, 7, 39) and published data and findings in annual progress reports. To monitor water quality data in Koocanusa Reservoir and downstream Kootenai River, following construction of Libby Dam, the Corps of Engineers developed a study proposal (Ref. 8) which is now being implemented. In constructing Koocanusa Reservoir, the U. S. Corps of Engineers (Ref. 9) found it necessary to relocate the town of Rexford. In so doing, the Corps provided a new sewage collection and treatment system, which consists of secondary sewage treatment followed by a polishing lagoon (winter storage) and spray irrigation for final disposal. To inform the public and obtain public input, the Corps of Engineers prepared brochures (Ref. 10) dealing with use pland and recreation on the reservoir.

In addition to the Corps of Engineers efforts, the Montana Department of Fish and Game, and the Montana Department of Health and Environmental Sciences have collected water quality data in tributary streams and from waste sources throughout the Kootenai drainage basins. These studies are described in Section VII of this report. In 1965, the Montana Resources Board published a Water Resources Survey (Ref. 13) for an area including the Kootenai drainage basin. This report is primarily concerned with irrigation, both existing and potential, and presents a considerable amount of data.

Figure 1 — Sketch map showing the Kootenai River Basin



In 1970, the Montana Department of Planning and Economic Development published a county-wide (similar to basin-wide) water and sewer plan (Ref. 12) which delineates existing and future water and sewer collection and treatment facilities for all of the towns in the drainage basin. In 1971, the Zonolite (W. R. Grace) Company, a mining concern near Libby, produced an engineering plan (Ref. 15) to control an existing waste discharge to the Kootenai River. This plan has been implemented, and has eliminated the industrial waste discharge, except for some possible seepage discussed in Section V of this report. In 1972, the City of Libby produced a comprehensive plan (Ref. 11) for the city-county jurisdictional area. Section IV of the plan is concerned with water, sewer and storm water utilities.

A joint water quality report by the U. S. Corps of Engineers and British Columbia Pollution Control Branch is soon to be published. This report will summarize five years of Corps of Engineers water quality data plus an unknown but extensive amount of Canadian data, with special emphasis on the effects of Canadian industrial waste discharges to the Kootenai System.

Areawide Waste Treatment Management Plans

At the present time, there are no areawide waste treatment management plans (PL 92-500, Section 208) within the Kootenai drainage basin and none are expected.

Section 201 Facility Plans

No wastewater facility plans have been written for any municipalities within the Kootenai drainage basin. Any sewage construction grants awarded after July 1, 1974 will require, under the present federal grant program, a facility plan to be written by the municipality or their consulting engineers. Communities that will require facility plans are Libby and Eureka.

Level B Plans & Other Federal Plans

The only Federal-State type study which has been made for the Kootenai drainage basin is a 19-volume study made of the entire Columbia River drainage basin, including the Kootenai as a separate sub-basin region. The study is entitled "Columbia - North Pacific Region Comprehensive Framework Study of Water and Related Lands" (Ref. 1, 2, 3). Information from various portions of these volumes is used throughout this plan. In addition, the Pacific Northwest River Basins Commission, in cooperation with the Montana Department of Natural Resources and Conservation and the Montana Study Team, is conducting subarea reports for an overall water plan for the State of Montana. This series of reports is being made in conjunction with a legislative moratorium on interstate water transfers. At present the subarea report for the adjacent Flathead drainage basin is in progress, and a similar report for the lower Clark Fork River is in the tentative planning stage. A similar study will eventually be conducted on the Kootenai River Basin. These plans are much more detailed in nature than the existing Comprehensive Framework Study, but cover essentially the same topics.

III. BASIN PHYSICAL CHARACTERISTICS

The Kootenai River basin (Plate I) is in the northern Rocky Mountains and is characterized by large, steep mountains that are heavily timbered and contain numerous, relatively narrow valleys. The area is sparsely inhabited and contains few industries and communities. The basin includes almost all of Lincoln County and, along the east and southeast portions, contains small areas of Flathead County. The basin is entirely drained by the Kootenai River which is tributary to the Columbia River. The entire basin was designated as one segment by the State of Montana.

Water in the basin is nearly all classified as B-D_1 by the State of Montana. Water of this classification is to be maintained suitable for drinking, culinary and food processing purposes after adequate treatment equal to coagulation, sedimentation, filtration, disinfection and any additional treatment necessary to remove naturally present impurities; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.

The general water quality requirements for B-D_1 waters are listed in Section IX and the detailed water classification and water quality standards applicable to the basin are in Appendix II.

Climate

Weather stations in the Kootenai basin include two partial stations--Libby Dam and near the community of Libby. The Libby Dam station is operated by the U.S. Corps of Engineers and records daily precipitation and high-low temperatures. The other station is located at the U.S. Forest Service ranger station one mile northeast of Libby, where the Forest Service records daily precipitation and high-low temperatures. The nearest complete weather bureau station is located near Kalispell in the adjacent Flathead River drainage basin.

Precipitation in the Kootenai basin, for the most part, is in the 12-24 inches/year range, with a small mountainous area in the north-central part of the basin receiving 24-48 inches per year (Ref. 32, p. 51). All of the Kootenai drainage basin lies within the confines of the 80-120 days frost free growing season (Ref. 42, p. 57). Mean annual temperatures in the Kootenai basin lie within the 40-44°F isotherms (Ref. 42, p. 58) and mean annual lake evaporation in the basin is approximately 28 inches (Ref. 42, p. 60).

Hydrogeology

The primary source of domestic water supplies in Lincoln County is ground water. As of December 1969, 644 well and 52 spring appropriations were on file at the Montana Bureau of Mines and Geology. Approximately 75 percent of these wells and springs are used for domestic purposes, 14 percent for domestic and stock, the remainder are used for irrigation, industry and other uses.

The majority of the wells are located in the county's three major lowland areas: (1) the Tobacco River, Fortine Creek, and upper Kootenai River near Eureka; (2) the Libby-Pipe Creek area in the south-central part of

Lincoln County near Libby, and (3) the lower Kootenai River, Lake and O'Brien Creek area in the southwestern part near Troy. The occurrence and distribution of groundwater is closely related to the geology of the county.

The entire drainage is underlain by a thick sequence of varicolored argillite, quartzite, and carbonate rocks of the Precambrian Belt Series (over 600 million years old). The Belt Series is about 40,000 feet thick and has been partially metamorphosed, producing tightly compacted sediments with little or no porosity or permeability. Due to low permeabilities, small quantities of water (0 to 10 gallons per minute) can be obtained from wells drilled into these rocks unless a weathered or fractured zone is encountered.

During Pleistocene time (less than 1 million years ago), one or more large ice sheets came down from Canada and covered most of Lincoln County, including most of the mountainous areas (Alden, 1953, USGS Prof. Paper 231). When the glaciers receded, they left thick deposits (especially in the lowland areas) of glacial till interbedded with glacial lake sediments. The lake sediments were deposited as a result of periodic damming of the ancient Kootenai River by ice. Glacial till consists of well-compacted, poorly-sorted mixtures of clay, silt, sand and gravel. The lake sediments consist of well-sorted, finely-laminated, silty clay. Due to the heterogeneous nature of these glacial deposits, their water-bearing characteristics are highly variable. Available information from wells located in the three major lowland areas suggests that the glacial deposits are more than 300 feet thick and that yields of 5 to 50 gpm can generally be expected from wells less than 150 feet deep.

Alluvial floodplain deposits of unknown thickness are present along all the major streams particularly the Kootenai, Tobacco, and Yaak Rivers. These sediments are Recent in age and are derived from the surrounding bedrock and glacial debris. Much of the fine-grained material has been removed from these deposits, leaving a well-sorted, coarse-grained alluvium. High capacity wells are in use at Troy, Eureka, and the St. Regis Paper Company near Troy. Presently, the Recent floodplain alluvium is the only aquifer in the drainage capable of producing large quantities of groundwater.

Very little information on groundwater quality is available for the Kootenai River basin. Scattered chemical analyses of municipal supplies for the towns of Libby, Troy, Rexford, and Eureka indicate that the surface and groundwater is of excellent quality. The water is a calcium bicarbonate type, slightly hard, and the dissolved solids are less than 330 parts per million. Groundwater derived from glacial deposits is likely to be of good quality but more mineralized than water from the floodplain alluvium. There are no known areas of groundwater pollution in the drainage.

Soils

Soil groups most widely represented in the Kootenai River basin in Montana are grassland soils on outwash terraces, grassland soils on glacial till, transitional grassland-forested soils on glaciofluvial terraces, forested soils on outwash terraces, forested soils on glacial till deposits, forested soils on glaciofluvial terraces and forested soils on steep bedrock mountains.

Grassland soils on outwash terraces are dominated by gently sloping to sloping loams which are underlain by loose very gravelly sand. These soils are used mainly for range and pasture with some acreage of irrigated hay and small grains. These soils present a slight to moderate erosion hazard. Grassland soils on glacial till are dominated by undulating to hilly loams with various amounts and sizes of coarse fragments throughout the profile. These soils usually contain a calcium carbonate horizon and some are calcareous near the surface. These soils are used for range and pasture. They can presenta moderate to severe erosion hazard on the steeper slopes. Transitional grassland-forested soils on glaciofluvial terraces are dominated by gently sloping to sloping silt loams, sandy loams and loamy sand with a calcium carbonate horizon. These soils are used for the production of forest products and present a slight to moderate erosion hazard.

Forested soils on outwash terraces are dominated by gently sloping to undulating, gravelly and cobbly loam, silt loam and fine sandy loam soils and are underlain by very gravelly and cobbly sand materials. These soils are used primarily for the production of forest products although most of the urbanization around Libby and Troy are on these soils. They present a slight erosion hazard. Forested soils on glacial till deposits terraces are dominated by undulating to hilly deep loamy soils containing various amounts of coarse fragments. These soils are used for the production of forest products and outdoor recreation and present a moderate erosion hazard.

Forested soils on glaciofluvial terraces are dominated by undulating to hilly silt loam, sandy loam and loamy sand. Included are areas of glaciolacustrine deposits, some of which have clay subsoils and laminated clay substrata. These soils are used primarily for the production of forest products and they present a moderate to severe erosion hazard.

Forested soils on steep bedrock mountains are dominated by shallow soils, bedrock outcrops and some deep loamy soils containing a high percent of coarse fragments intermingled on steep and very steep mountain slopes. Soils developed on glacial till and glaciofluvial deposits occur in the narrow valleys. These soils are used primarily for the production of forest products and present a severe erosion hazard if mismanaged.

The soils of the Kootenai River basin have generally presented little problems where domestic water wells and individual sewage systems have been constructed. The alluvial gravels deposited in the major stream drainages account for the abundant groundwater and porosity of the soil.

Land Use

The majority of the 2.4 million acres of land in the Kootenai River basin is covered by forests. A total of 2.3 million acres is a combination of national, state, industrial and private forest lands. Urban and developed areas account for the 12,800 acres, small water areas for 4,003 acres, state land (other than forests) for 2,014 acres, with the remaining 70,646 acres in other private land.

While the production of beef cattle is the most important agricultural enterprise in the basin, almost all the agricultural producers have some woodland, Christmas trees, or forest products along with their other crops.

Cropland accounts for 19,300 acres, of which 5,250 acres are irrigated. There are 13,213 acres of pastureland and 33,409 acres of rangeland. Irrigated pastureland accounts for 2,120 acres of the total. Wheat, barley and oats are the major crops produced and are used locally as livestock feed. Hay is grown to meet the feed needs of local operators.

A portion of one wilderness area and three scenic areas are located within the basin. The Cabinet Wilderness area lies west and south of Libby and covers 54,609 acres extending the length of the main Cabinet Range. The three scenic areas contain a total of 11,447 acres while the Ten Lakes area has a proposed 3,400 acre extension. Copper and vermiculite deposits are located in the basin and exploration and mining is continuing. No energy fuel minerals are known to exist in commercial deposits in the basin.

Water Use

The 3,750 square-mile drainage area of the Kootenai, Fisher and Yaak Rivers yields nearly 14 million acre-feet of water per year to the Columbia River drainage. The huge Libby Dam, above the City of Libby on the main stem of the Kootenai River, stores 5,850,000 acre feet of water and will provide an ultimate capacity of 840,000 kilowatts of power to the Columbia River system.

There are 7,370 acres of irrigation in the basin, most of which produces hay or pasture for forage. All has been developed by private sources and no large irrigation projects exist in the area. There are 191,000 acres of potentially irrigable land within the basin.

Municipal and rural domestic water use is largely unquantified except where central water systems exist. Libby is served by a water distribution system from Flower Creek. Total water consumption approaches 552 million gallons per year. Eureka is in the process of constructing a new system adjacent to the Tobacco River and presently uses 152 million gallons per year. Troy obtains its water supply from O'Brien Creek and one drilled well and consumes 4.8 million gallons per year. Residents of Fortine and Stryker utilize central water systems operated by private owners and Trego residents utilize private wells and developed springs.

Demography and Economics

For purposes of this economic profile, the Kootenai Basin and Lincoln County are considered to be the same thing. The county is predominantly rural, with 82% of the 1970 population of 18,063 classed as rural by the 1970 census. Major communities and their populations are listed in Table 1.

TABLE 1 KOOTENAI RIVER BASIN, MAJOR COMMUNITIES WITH THEIR 1970 POPULATION

Community	1970 Population
Eureka	1,195
Fortine	400
Happy's Inn	75
Libby	3,286
Rexford	243
Stryker	62
Trego	305
Troy	1,046
Yaak	50

In recent years, the basin has experienced considerable economic and social impact resulting from the construction of Libby Dam. This impact could be continued into the future if the decision is made to construct a streamflow regulating dam downstream from the main structure. The area supports a significant timber industry. Nearly three-quarters of the county is in Federal ownership (Kootenai National Forest). In terms of timber production this is probably the most productive forest in Montana. More intensive forest management could increase timber production; however, this is not expected to bring significant economic effects. High outdoor amenities, lack of development, and the creation of Lake Koocanusa are all factors pointing towards increased potential as a recreation area. Extensive copper ore deposits lie in the Bull Lake area. Table 2 lists historical and projected population and employment.

TABLE 2 KOOTENAI RIVER BASIN POPULATION AND EMPLOYMENT, HISTORICAL AND PROJECTED 1930-1985

	1930	1940	1950	1960	1970	1980	1985
Population	7,089	7,882	8,693	12,537	18,063	18,000	19,000
Employment Total	2,976	2,347	2,713	3,625	6,107	6,086	6,424
Agriculture	532	458	320	134	193		
Forestry & Fisheries	517	282	79	118	178		
Mining	107	121	120	171	198		
Construction	156	64	118	170	1,233		
Manufacturing	506	534	837	1,482	1,669		
Services & Other	1,158	888	1,239	1,550	2,636		

Biological Conditions

Except for a few small lakes, waters in the Kootenai Basin are cold water habitats. Cold water game fish present in the basin include Pygmy and Mountain Whitefish; Cutthroat, Rainbow, Brook, and Lake Trout; and Dolly Varden. The only population of White Sturgeon in Montana is in the Kootenai River below Kootenai Falls. In this section of the river, a few Kokanee are present in the fall. These fish are thought to be on spawning runs from Kootenay Lake, British Columbia. Non-game cold water fish include Burbot, Largescale and Longnose Suckers, Slimy and Torrent Sculpins, Redside Shiner, Northern Squawfish, Peamouth, and Longnose Dace. Warm water fish include Pumpkinseed, Largemouth Bass, Black Bullhead, and Yellow Perch (Ref. 41).

Biological conditions in most of the smaller streams and lakes are good. Excessive silt and channel instability in the Fisher and Tobacco Rivers and some of the smaller streams, are minor problems now and potentially major problems. The instability and excessive silt are apparently caused by past fires and excessive logging (Ref. 40).

Future development of a major copper deposit above Bull Lake could adversely affect the biological conditions of Bull Lake, Lake Creek and the Kootenai River, as well as waters in the Clark Fork Basin. Baseline water quality data is being gathered in this area by the U. S. Forest Service, Montana Fish and Game Department and Montana Department of Health and Environmental Sciences. Aquatic insect data collected from the Kootenai River by Bonde (Ref. 7) indicate the Kootenai River below Libby Dam is a fertile stream. However, there are problems in this section of the river and potential problems in Lake Koocanusa.

Rainy Creek (mouth 12.0 miles below Libby Dam), receives sediment from a mine-mill operation. This sediment has had a depressing effect on insect and fish populations in the Kootenai River for many miles below Rainy Creek. Control facilities at the mine-mill have reduced sediment loads considerably since 1971. Numbers and species diversity of aquatic insects in the Kootenai River below Rainy Creek have gradually increased to nearly normal levels in conjunction with the sediment decrease (Ref. 33). Gas supersaturation caused by the Libby Dam discharge has reduced the population of Mountain Whitefish by about 90 percent and trout populations by 50 to 70 percent in the first five to six miles below the dam. Some effects of this supersaturation (gas bubble disease) on fish populations are evident for about 17 miles below the dam (Ref. 38). The White Sturgeon population in the Kootenai River may be lost due to changes in flows and temperatures caused by Libby Dam (Ref. 40).

Phosphorous derived from a large fertilizer plant near Kimberly, British Columbia is responsible for very high levels of phosphorous in Lake Koocanusa. These high phosphorous levels may cause the lake to exhibit the symptoms of eutrophication. This problem and the gas supersaturation problem are being investigated by the State Fish and Game Department and the U. S. Army Corps of Engineers.

IV. MONTANA WATER POLLUTION CONTROL PROGRAM

General

Water quality management planning is part of a broad comprehensive water pollution control program administered by the Water Quality Bureau of the Environmental Sciences Division. This program is described in the annual report of the Water Quality Bureau (1973). Important elements of the state program are:

1. State and Federal waste discharge permit program
2. Water quality standards
3. Facilities construction grants, plan review, operation and maintenance, inspections, training and licensing of operators
4. Statewide monitoring and surveillance program
5. Public participation
6. Enforcement

State and Federal Waste Discharge Permit Program

The 1955 Montana State Law established a waste discharge permit program. A revision of this law in 1967 required a permit for all discharges. Regulations and a formal state permit program were established in 1968 for the discharge of sanitary sewage and municipal wastes to waters of the state. To date, 74 industrial and 134 sewage permits have been issued. Larger dischargers are required to submit monitoring information on their effluents. In 1972, a waste discharge permit regulation for confined livestock feeding was adopted by the Board of Health. All operations feeding cattle, swine, sheep or other livestock for marketing purposes within any confined area or enclosure which is not normally used for raising crops of pasture, which at any time discharges drainage water to a state water, is required to have a permit. Existing operations are required to have a permit before June 24, 1974. All new or expanding operations are required to have a permit immediately.

The Federal Water Pollution Control Act Amendments of 1972 established a national permit system. Industrial, municipal and other point source dischargers will be required to obtain permits to discharge pollutants into navigable waters or their tributaries. The EPA (U. S. Environmental Protection Agency) is given authority to allow states to administer the permit program providing the states conform to certain guidelines. Montana is developing a revised permit system and plans to take over most of the federal permit program during fiscal year 1974.

The waste discharge permit is an effective tool for regulating discharge of potentially harmful effluents into Montana lakes and streams. It will require treatment works discharges to meet specific effluent standards. In most instances, the discharger will be responsible for certain monitoring information; for example, sampling and analysis of the water as specified at intervals. In instances where the effluent being discharged does not meet state standards, the permit is issued on a "compliance" basis, with stipula-

tions as to what corrections will be made and when.

The Act also provides that the permit program will achieve, not later than July 1, 1977, effluent limitations for point sources, other than publicly owned treatment works, which shall require the application of best practicable control technology. For publicly owned treatment works, secondary treatment of wastes will be required by July 1, 1977. The Act further specifies that by July 1, 1983, effluent limitations for point sources, other than publicly owned treatment works, shall require application of the best available technology. Publicly owned treatment works shall achieve best practicable treatment by July 1, 1983. These steps will result in progress toward a national goal of eliminating the discharge of all pollutants by 1985.

Water Quality Standards

Water pollution control was officially started in Montana in 1907 with the passage of legislation designed to protect domestic water supplies. A law passed in 1955 was more comprehensive. It dealt with the control and protection of water for additional uses--recreation, agriculture, and industry. The law also established a Water Pollution Control Council and charged it with the tasks of classifying all streams in the state according to their most beneficial uses and establishing water quality criteria for the streams. It also involved upgrading the treatment of wastes going into the streams. Montana thus became one of the first states to have enforceable stream classifications.

In 1965, the U. S. Congress passed the Federal Water Quality Act, which required that all states classify and establish water quality criteria for their interstate streams by July 1, 1967. This resulted in Montana revising its standards for both interstate and intrastate waters, and requires a higher degree of stream quality than before. Secondary treatment or the equivalent was required of municipal and industrial discharges. Primary treatment or the equivalent was required before passage of the Act.

In October 1972, the Federal Pollution Control Act Amendments were passed by Congress, expanding the authority of the Environmental Protection Agency. Uniform water quality standards and enforcement procedures throughout the United States is the objective. For example, industrial waste dischargers throughout the nation manufacturing the same product will have uniform discharge requirements based on the amount of product produced. Again, Montana was required to revise its water quality standards. The Department of Health and Environmental Sciences adopted these revised standards on July 13, 1973. The new standards became effective in November, 1973.

Montana water quality standards serve as a functional tool in protecting water quality; however, a number of laws, statutes and regulations complement the water quality standards and significantly assist in protecting water quality. Acts and statutes of the State of Montana which directly influence water quality are:

Law or Statute	Title	Chapter	R.C.M.
1. Water Pollution Control	69	48	1947

Law or Statute (continued)	Title	Chapter	R.C.M.
2. Public Water Supply	69	49	1947
3. Subdivisions	69	50	1947
4. Water and Wastewater Operators Certification	69	59	1947

These are administered by the Water Quality Bureau. Similarly, the Bureau enforces a number of regulations directly influencing water quality.

Regulation No.	Name
1. MAC 16-2.14(10)-S14320	Plans for Water and Sewer Systems
2. MAC 16-2.14(10)-S14340	Approval of Water and Sewer Facilities in Subdivisions
3. MAC 16-2.14(10)-S14350	Groundwater Supply, Investigation
4. MAC 16-2.14(10)-S14360	Surface Water Supply, Investigation
5. MAC 16-2.14(10)-S14460	Montana Pollutant Discharge Elimination System

Statewide Monitoring and Surveillance Program

Prior to 1972, Montana had done little monitoring due to the lack of funds. With increased appropriations provided by the 1971 legislature and the federal government, the state greatly increased its effort. Personnel were added to the staff and laboratory equipment was purchased. The present state monitoring program includes periodic compliance monitoring of municipal and industrial wastes, long-term base line monitoring of streams, and a statewide program for determining the general quality of all significant surface waters.

The statewide inventory of water quality will identify areas with water quality problems and will provide basic data for water quality management and planning programs. Included in the monitoring is a statewide assessment of the trophic (pollution level) status of Montana's lakes, reservoirs and ponds. This program is coordinated with the EPA National Eutrophication Survey.

Facilities Construction, Operation and Maintenance

A minimum requirement of primary treatment for all domestic sewage was first adopted by the Montana Board of Health in 1952. All of Montana's communities have met this requirement, and many of the communities are upgrading their facilities to secondary treatment or are in the process of constructing or planning secondary treatment systems. Since 1956, there has been a federal grant program to assist municipalities in the construction of sewage treatment facilities including outfall and interceptor sewers. In 1971, the Montana state legislature appropriated $4,000,000 to aid municipalities in

construction of these same facilities. The 1973 legislature appropriated $1.6 million to reimburse municipalities that had proceeded with construction since July 1, 1966 without waiting for state grants. With passage of the Federal Water Pollution Control Act Amendments of 1972, 75 percent of eligible project costs are federally financed. Due to a shortage of federal grant funds, a priority system for fund allocation must be used. The state, under EPA guidance, establishes priorities for proposed waste treatment projects.

An important part of municipal sewage treatment is proper operation and maintenance of facilities after construction is completed. In an effort to improve operation and maintenance, the state has conducted an operators school each year. During recent years, this school has had about 100 operators attending. In 1971, a grant was obtained from the federal government for employing two training instructors to establish training programs throughout the state. This activity is in addition to the annual school.

An operators certification program was established in 1968 following enactment of a law requiring certification of those in responsible charge of sewage treatment or industrial waste treatment systems.

Public Participation

Public participation in the water pollution control is an increasingly important aspect of the state program. Public hearings are held concerning proposed regulations, water quality management plans, and waste discharge permit applications. The state also has an environmental impact statement requirement. These statements are presented to the public for comment, and hearings are conducted on highly controversial issues.

The public also is kept informed by means of a Water Pollution Control Advisory Council, which has been established by law to assist the Water Quality Bureau in preparation of rules and regulations and dissemination of information to interested groups. Similarly, public meetings are attended on request and a quarterly newsletter is published by the Water Quality Bureau.

Enforcement

The 1955 Montana state law provided enforcement procedures. These laws were revised in 1971 to provide better enforcement, and an attorney was added to the staff of the Department of Health and Environmental Sciences to aid in enforcement. The state permit system provides a primary means for enforcement. Violations of permit conditions or discharges without a permit can lead to enforcement.

V. WATER POLLUTION SOURCES

In the Kootenai drainage basin, water pollution may result from a number of activities, only a few of which are represented by point discharges. In the basin, there are five sewage collection systems, and one of these is designed on a non-overflow basis. Two industrial waste sources exist, and one is basically a non-overflow system. Characteristics of all known discharges, both domestic and industrial, are shown in Table 3.

Municipal Discharges

The towns of Libby, New Rexford, and Eureka, the Libby-St. Regis mill, and a private trailer court provide the five sewage collection and treatment systems in the basin. The towns of Troy and Fortine and other small communities in the basin dispose of sewage by means of septic tanks and drainfield systems.

Libby - The City of Libby is served by a primary sewage treatment plant which discharges to the Kootenai River. Approximately 3,000 people are served on this system, which consists of a 45-foot diameter clarifier, a 35-foot diameter heated digester, and a chlorine contact tank. Dry weather plant inflows of 0.5 MGD increased to more than 1.5 MGD during spring runoff, indicating considerable infiltration problems. Libby is in the process of application for an EPA construction grant to upgrade to secondary treatment. The Kootenai River at Libby is regulated at a minimum flow of 2,000 cfs by Libby Dam, providing a considerable dilution factor for the Libby discharge.

St. Regis Co. - Libby Plant - The St. Regis mill, on the east side of Libby, produces plywood and cut lumber. Some 1,000 employees are served by a trickling filter-type sewage treatment plant. The treatment plant consists of a bar screen, primary-secondary clarifier, 22-foot diameter rock-media trickling filter, a mixed, 20-foot diameter digester, chlorinator and chlorine contact tank. Disinfection is achieved throughout the year. The plant effluent is combined with log pond effluent and is discharged to the Kootenai River approximately one-half mile upstream from the City of Libby discharge. Capacity of the treatment plant is 0.1 MGD, although flows are normally around .06 to .075 MGD. Waste characteristics are described in another section of this report.

Town of New Rexford - In the construction of Libby Dam, the U. S. Corps of Engineers found it necessary to relocate the Town of Rexford to a new site. The new town of New Rexford was supplied by the Corps with a full set of utilities including a sewage collection and disposal plant. The new system currently serves 120 people via 35 connections and is expected to expand considerably in the near future. The disposal plant, located west of town, includes a control building with blower equipment and lab, an aerated lagoon which is aerated with compressed air and a large storage pond for winter effluent storage. The large storage pond is capable of aeration with fixed-type aerators. This pond has not begun to fill as yet. Final effluent, when present, will be sprayed with 22 alternating spray heads around the periphery of the lagoons. This would normally be accomplished in the summer and fall months. The

TABLE 3

[illegible] WASTE SOURCE INVENTORY

STATE Montana
BASIN Kootenai
SEGMENT
TYPE WASTE SOURCES Mun. & Ind.

NAME OF WASTE SOURCE	WASTE SOURCE IDENTIFICATION DATA: TYPE OF TREATMENT	DISCHARGE LOCATION: RECEIVING WATER	DISCHARGE LOCATION: TNS RNG SEC TRACT[1]	DISCHARGE PERMIT NO.[2]	AVERAGE DAILY FLOW[3]	TYPE OF DISCHARGE[4]	WASTE SOURCE QUANTITY AND QUALITY DATA: EFFLUENT PARAMETERS MEASURED[5] Avg. BOD_5 mg/l	Avg. BOD_5 #/day	Avg. BOD_5 %Remvl	TSS mg/l	TSS # /day	TSS %Remvl	pH	FECAL COLIFORM Number/100 ml.	P.E. Raw	P.E. Treated	COD mg/l	COD #/day
[illegible]	Primary with Chlorination (Spiragester)	Tobac[illegible] R. (Class B-D1)	36N 29W [illegible] DDC	MT-0021725 (S)	[illegible]	C	-	-	-	70	58	-	6.7	$17x10^6$	1100	800	134	112
Libby	Primary with Chlorination	Kootenai R. (Class B-D1)	31N 31W 34 C[illegible]	MT-0020494 (S)	1.0	C	105	875	-	46	384	-	7.3	$42x10^4$	3000	2000	100	834
Rexford	Aerated Lagoon and Polishing Pond	No Discharge (Spray irrig.)	36N 28W 11 ABB	None Required	0	None	NA	NA	NA	NA	NA	NA	NA	NA	150	0	-	-
Libby Dam (Libby)	Aerated Lagoon Effluent Holding tank and Chlorination	Kootenai R. (Class B-D1)	31N 29W 33 BDB	None Yet Required	.006*	I	-	1.9*	85*	-	-	85*	-	-	1000*	150*	-	-
Belle Vue Trailer Court, Libby	Package Aeration Plant	Unnamed tributary, Kootenai R. (Class B-D1)	31N 31W 32 DDB	MT-0023621 (S)	0.01*	I	121	10	-	78	7	-	5.7	$11x10^3$	Est. 120	-	141	12
St. Regis Co. Sewage, Libby	Secondary, trickling Filter plus chlorination	Kootenai R. (Class B-D1)	30N 31W 03 AAD	MT-0000221 (S)	0.07	C	25	15	65	50	2[illegible]	54	6.7-7.2	-	250	88	-	-
St. Regis Co., Libby, L[illegible] pond	Settling ponds	Kootenai R. (Class B-D1)	30N 31W 03 AAD	MT-0000221 (S)	13.6	C	5	569	30	22	2500	75	6.7-7.3	350			35	3980
W.R. Grace Co. Zonolite Div. (Libby)	Complete Retention and recycle	Kootenai R. (Class B-D1)	31N 30W 15 D[illegible]	none Required	None	None	NA	NA	NA	NA	NA	NA	NA	NA			NA	NA
Granite Concrete Co. (Libby)	Settling Ponds	Libby Creek (Class B-D1)	30N 31W 14 BBB	None Required	None	None	NA	NA	NA	NA	NA	NA	NA	NA			NA	NA

1. See explanation of description in Appendix 1
2. S - State issued; A - EPA issued; C - Corps of Eng. issued
3. For period of discharge, values in MGD
4. C - Continuous; I - Intermittent (Discharge period [illegible])
5. Typical Discharge Analysis

NOTE: Information from st[illegible] plant [illegible], [illegible] test results

* Design figures; not yet completed

Canadian Industrial Discharges - Canadian industrial discharges have considerable effect on water quality in the Kootenai River. This is discussed in Sections VII and IX of this plan.

Non-Point Pollution Sources

Agriculture

One of Montana's largest contributors to non-point water pollution is of very little importance in the Kootenai drainage basin. Most of the basin is very mountainous and provides little land suitable for farming. Some available farm land was along the Kootenai River and is now inundated by Koocanusa Reservoir. Some farming or ranching exists in the Eureka-Tobacco River area, but is not thought to be significant from a water quality standpoint. Of the 2.4 million acres in the basin, only 5 percent (0.8 million acres) is suitable for irrigated or dryland farming.

Forestry

Without a doubt, forestry is the largest contributor to non-point stream pollution in the Kootenai drainage basin. Siltation, elevated water temperatures and increases in nutrients are quality problems normally created in surface waters in heavily logged areas. Land use data (circa 1965) indicates that about 2/3 of the total land area of all types in the Montana portion of the Columbia River Drainage Basin is in active timber production. The percentage is probably higher in the Kootenai portion of the basin.

Montana Water Quality Standards developed pursuant to Section 69-4808.2 (1)(b) RCM 1947 state, "Pollution resulting from non-point sources, including irrigation practices, road building, construction, logging practices overgrazing and other practices, are to be eliminated or minimized as ordered by the (State Health) department." These Water Quality Standards will be supplemented by guidelines that will control pollution from activities such as logging. In the past, there have been no detailed investigations of long-term or latent effects from logging such as gradual thermal increases, or nutrient enrichment of downstream lakes or impoundments. Such effects will be difficult to examine and control, however, the basic guidelines related to pollution from logging must be developed to insure minimal effects of the practice on water quality.

Libby Dam

Like many hydroelectric dams, Libby Dam causes serious nitrogen supersaturation problems which has resulted in fish mortalities a number of miles downstream. This is fully discussed in Section VII of this plan.

Sludge Disposal

Each MPDES permit issued to dischargers to State waters contains the following standard condition:

..."Removed Substances...Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering State waters."

In addition, each sludge disposal plan must be reviewed and approved by the State Department of Health and Environmental Sciences to assure that public health and nuisance problems are avoided. The sludge disposal method best suited to Kootenai basin communities would be concentration in sludge drying beds, followed by disposal in a sanitary landfill. The only requirement for disposal of non-health related industrial sludges is as stated in the standard permit condition above. In addition, agricultural use of sludges is generally condoned, except on crops for human consumption.

VI. SURFACE WATER RESOURCES

The U. S. Geological Survey has maintained 10 streamflow gaging stations in the Kootenai drainage basin (Figure 1). Three of these are now inundated by Koocanusa Reservoir, and the remaining seven are active. Streamflow data has been catalogued for the Kootenai River at five locations and for all of its three largest Montana tributaries, Yaak River, Fisher River and Tobacco River. Typical streamflow data (Ref. 14, 1971) are presented in Tables 4 and 5 for the Kootenai River near Libby (Station 12,303,000) and the Yaak River near its mouth (Station 12,304,500). The total flow from the basin in water year 1971 exceeded 11,000,000 acre-feet. The largest tributary, Yaak River, provided 785,000 acre-feet or about 7 percent of the total flow.

A schematic profile of the Kootenai River and the locations of its ten largest tributaries is shown on Figure 2. Geographically, the Kootenai and its tributaries (Table 6) all have very narrow, steep, heavily-wooded drainage basins. Peak spring flow in the tributaries typically is in May and that of the Kootenai River is in June. With the exception of the Tobacco River sub-basin, the Kootenai sub-basins are very sparsely populated and largely undeveloped. The Tobacco basin contains the town of Eureka, the second largest town in the basin. Data relative to all U. S. Geological Survey gaging stations are shown in Table 7.

TABLE 4

TYPICAL STREAMFLOW IN THE YAAK RIVER

KOOTENAI RIVER BASIN

12304500 Yaak River near Troy, Mont.

LOCATION.--Lat 48°33'43", long 115°58'09", in NE¼SE¼SW¼ sec.5, T.37 N., R.34 W., Lincoln County, Kootenai National Forest, on right bank 500 ft upstream from bridge on U.S. Highway 2, 0.2 mile upstream from mouth, and 7.7 miles northwest of Troy.

DRAINAGE AREA.--766 sq mi.

PERIOD OF RECORD.--October 1910 to September 1916 (fragmentary record), March 1956 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,832.[illegible] ft above mean sea level. Oct. 15, 1910, to Sept. 30, 1916, nonrecording gage at several sites within 11 miles of present site at various datums.

AVERAGE DISCHARGE.--15 years, 927 cfs (16.44 inches per year, 671,600 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 9,220 cfs May 13 (gage height, 8.61 ft); minimum daily, 95 cfs Jan. 5.

Period of record: Maximum discharge, 12,100 cfs May 21, 1956 (gage height, 9.70 ft in gage well, 10.8 ft from outside gage); minimum daily, 80 cfs Jan. 19, 1957, Jan. 2, 1958, Dec. 13, 1967.

Flood in May to June 1948 reached a stage of 11.0 ft from floodmarks (discharge, 12,500 cfs). Flood in May 1954 reached a stage of 11.4 ft from floodmarks (discharge, 13,400 cfs).

REMARKS.--Records good except those for winter period, which are poor. Diversions for irrigation of about 30 acres above station. Records of water temperatures for the current year are published in Part 2 of this report.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	125	120	180	140	1,200	377	454	3,780	4,270	1,080	274	251
2	123	121	170	120	1,320	356	456	4,430	4,160	1,050	263	231
3	120	125	160	110	1,030	384	469	5,710	3,870	973	254	216
4	119	126	150	100	847	374	495	7,000	3,570	903	243	191
5	122	120	140	95	688	361	561	7,960	3,650	861	234	174
6	137	128	200	110	518	341	701	7,990	3,580	837	226	165
7	134	137	450	140	458	335	1,130	7,120	3,280	815	224	171
8	130	135	350	170	441	333	1,360	6,960	3,290	743	216	168
9	135	161	250	190	431	321	1,950	7,430	3,000	715	206	159
10	137	183	220	180	482	319	2,860	7,630	2,740	888	196	156
11	138	166	230	160	432	334	2,250	7,600	2,550	969	189	156
12	150	156	220	140	456	332	1,760	8,050	2,410	840	182	161
13	145	147	200	130	448	322	1,530	8,890	2,620	752	175	151
14	139	141	210	150	472	313	1,540	7,750	2,710	711	167	147
15	132	134	220	180	609	304	1,750	5,800	2,390	673	161	139
16	127	140	230	210	700	300	1,850	4,700	2,090	642	157	136
17	124	158	210	250	657	287	1,690	4,040	1,940	607	153	133
18	123	163	180	300	609	274	1,500	3,680	1,840	572	150	139
19	126	155	150	400	572	284	1,500	3,580	1,840	532	148	138
20	130	147	130	500	526	291	1,770	3,430	1,800	506	144	152
21	146	138	110	485	498	285	2,560	3,160	1,750	478	141	154
22	148	110	100	406	486	275	3,270	3,160	1,830	461	143	153
23	154	130	110	373	470	279	4,500	3,610	1,900	441	175	148
24	169	160	120	341	469	291	4,890	4,350	1,720	408	170	142
25	166	210	130	324	467	292	5,030	5,030	1,660	385	160	139
26	153	190	135	313	440	320	4,870	5,250	1,560	360	147	140
27	138	180	140	314	402	329	4,340	5,940	1,340	344	138	147
28	126	170	145	311	403	316	3,890	5,850	1,220	325	133	176
29	120	160	150	305	------	325	3,730	5,110	1,180	314	130	191
30	122	170	155	499	------	389	3,640	4,990	1,120	299	139	192
31	122	------	160	1,040	------	455	------	4,830	------	287	205	------
TOTAL	4,181	4,481	5,705	8,486	16,581	10,098	68,296	174,810	72,880	19,771	5,643	4,916
MEAN	135	149	184	274	592	326	2,277	5,639	2,429	638	182	164
MAX	169	210	450	1,040	1,320	455	5,030	8,890	4,270	1,080	274	251
MIN	119	110	100	95	402	274	454	3,160	1,120	287	130	133
CFSM	.18	.19	.24	.36	.77	.43	2.97	7.36	3.17	.83	.24	.21
IN.	.20	.22	.28	.41	.81	.49	3.32	8.49	3.54	.96	.27	.24
AC-FT	8,290	8,890	11,320	16,830	32,890	20,030	135,500	346,700	144,600	39,220	11,190	9,750

CAL YR 1970 TOTAL 240,176 MEAN 658 MAX 5,240 MIN 95 CFSM .86 IN 11.66 AC-FT 476,400
WTR YR 1971 TOTAL 395,848 MEAN 1,085 MAX 8,890 MIN 95 CFSM 1.42 IN 19.22 AC-FT 785,200

PEAK DISCHARGE (BASE, 5,000 CFS)

DATE	TIME	G.HT.	DISCHARGE	DATE	TIME	G.HT.	DISCHARGE
4-26	0100	7.31	5,200	5-27	2300	7.85	6,730
5-13	0145	8.61	9,220				

NOTE.--Stage-discharge relation affected by ice Nov. 22 to Jan. 20.

TABLE 5

TYPICAL STREAMFLOW IN THE KOOTENAI RIVER

KOOTENAI RIVER BASIN

12303000 Kootenai River at Libby, Mont.

LOCATION.--Lat 48°24'03", long 115°33'08", in SW¼SE¼SW¼ sec.34, T.31 N., R.31 W., Lincoln County, on right bank 1,800 ft downstream from highway bridge at Libby, 0.8 mile downstream from Libby Creek, and at mile 204.3.

DRAINAGE AREA.--10,240 sq mi, approximately.

PERIOD OF RECORD.--October 1910 to current year. Monthly discharge only for some periods, published in WSP 1316.

GAGE.--Water-stage recorder. Datum of gage is 2,041.54 ft above mean sea level. Prior to Apr. 28, 1931, non-recording gages at site 1,800 ft upstream at different datum.

AVERAGE DISCHARGE.--61 years, 12,110 cfs (16.06 inches per year, 8,774,000 acre-ft per year).

EXTREMES.--Current year: Maximum discharge, 69,200 cfs May 29 (gage height, 13.29 ft); minimum daily, 1,700 cfs Jan. 6.

Period of record: Maximum discharge, 121,000 cfs June 21, 1916 (gage height, 20.7 ft, present datum, derived from gage-relation study); minimum observed, 895 cfs Jan. 11, 1930 (discharge measurement).

REMARKS.--Records excellent. Diversions for irrigation of about 14,500 acres from tributaries above station in Canada and the United States. Records of chemical analyses for the current year are published in Part 2 of this report.

REVISIONS (WATER YEARS).--WSP 1042: 1933. WSP 1246: 1912(M), 1915(M), 1916, 1918-19(M), 1924-27(M).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1970 TO SEPTEMBER 1971

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5,100	3,880	3,100	3,340	10,400	3,840	4,220	19,000	60,500	31,600	18,200	8,130
2	5,070	3,870	3,290	3,170	10,400	3,550	4,220	20,500	56,700	31,800	15,700	8,550
3	5,050	3,860	3,300	3,140	9,120	3,720	4,180	24,700	54,300	31,600	15,500	8,940
4	4,980	3,840	3,290	2,500	8,040	3,570	4,180	31,400	54,500	30,900	16,900	8,880
5	4,970	3,780	3,110	2,000	6,960	3,570	4,260	39,300	57,100	29,100	17,400	8,460
6	5,020	3,780	2,890	1,700	5,880	3,460	4,480	44,100	61,000	27,100	17,300	7,950
7	5,120	3,810	3,470	1,800	5,000	3,400	5,150	44,300	62,400	26,000	16,800	7,530
8	5,310	3,830	3,920	1,900	4,280	3,420	6,080	43,100	62,600	24,300	16,200	7,320
9	5,330	3,890	4,330	2,000	4,080	3,460	6,720	44,600	63,400	22,300	15,600	7,860
10	5,250	3,980	3,880	2,100	4,200	3,420	7,860	47,200	61,500	22,400	15,000	7,980
11	5,120	3,980	3,850	2,000	4,630	3,480	8,640	47,900	53,600	25,600	14,400	7,440
12	5,050	3,920	3,500	1,900	4,880	3,570	8,280	50,300	47,300	29,800	13,800	7,110
13	4,980	3,860	3,290	1,800	4,980	3,610	7,590	56,800	45,600	29,600	13,200	6,960
14	4,880	3,810	3,230	1,900	5,330	3,590	7,260	63,400	47,500	27,000	12,800	7,020
15	4,760	3,760	3,250	2,000	5,980	3,530	7,590	62,400	48,700	25,600	12,200	6,780
16	4,640	3,740	3,460	2,200	6,600	3,500	8,460	52,500	45,400	25,600	11,600	6,450
17	4,560	3,730	3,590	2,400	6,550	3,460	8,880	43,300	40,000	26,800	11,000	6,230
18	4,620	3,810	3,550	2,700	6,100	3,400	8,640	36,700	36,300	28,200	10,300	5,980
19	4,430	3,770	3,520	3,040	5,800	3,350	8,250	32,400	34,600	28,300	9,840	5,880
20	4,270	3,730	3,160	4,400	5,350	3,310	8,430	29,900	34,400	27,900	9,450	5,780
21	4,350	3,770	2,790	4,630	4,850	3,310	10,000	28,900	36,000	28,700	9,060	5,650
22	4,360	3,340	2,560	4,700	4,600	3,310	12,400	27,700	40,000	29,000	8,790	5,550
23	4,370	2,870	2,200	4,460	4,420	3,240	14,800	28,200	45,400	28,700	8,730	5,430
24	4,400	2,550	2,000	4,480	4,320	3,260	17,500	31,200	50,500	27,800	8,820	5,280
25	4,460	3,140	1,800	4,540	4,360	3,350	20,300	38,100	53,900	27,100	8,880	5,180
26	4,450	3,350	2,000	4,380	4,300	3,520	23,300	47,200	52,200	25,300	8,520	5,080
27	4,350	3,190	2,200	4,260	4,140	3,710	22,700	55,800	47,800	22,200	8,070	5,050
28	4,240	2,840	2,400	4,160	3,980	3,690	21,500	63,400	41,700	20,700	7,830	5,000
29	4,120	2,550	2,530	4,180	------	3,670	20,200	68,700	36,200	20,000	7,470	5,080
30	3,980	2,850	2,870	5,200	------	3,820	19,300	67,800	32,600	19,700	7,500	5,130
31	3,920	------	3,290	9,540	------	4,120	------	63,300	------	18,900	7,740	------
TOTAL	145,510	107,080	95,620	102,520	159,530	109,210	315,370	1,354.1M	1,463.7M	819,600	374,600	199,680
MEAN	4,694	3,569	3,085	3,307	5,698	3,523	10,510	43,680	48,790	26,440	12,080	6,656
MAX	5,330	3,980	4,330	9,540	10,400	4,120	23,300	68,700	63,400	31,800	18,200	8,940
MIN	3,920	2,550	1,800	1,700	3,980	3,240	4,180	19,000	32,600	18,900	7,470	5,000
CFSM	.46	.35	.30	.32	.56	.34	1.03	4.27	4.76	2.58	1.13	.65
IN.	.53	.39	.35	.37	.58	.40	1.15	4.92	5.32	2.98	1.36	.73
AC-FT	288,600	212,400	189,700	203,300	316,400	216,600	625,500	2,686M	2,903M	1,626M	743,000	396,100

CAL YR 1970 TOTAL 3,312,710 MEAN 9,076 MAX 56,200 MIN 1,650 CFSM .89 IN 12.03 AC-FT 6,571,000
WTR YR 1971 TOTAL 5,246,520 MEAN 14,370 MAX 68,700 MIN 1,700 CFSM 1.40 IN 19.06 AC-FT 10,410,000

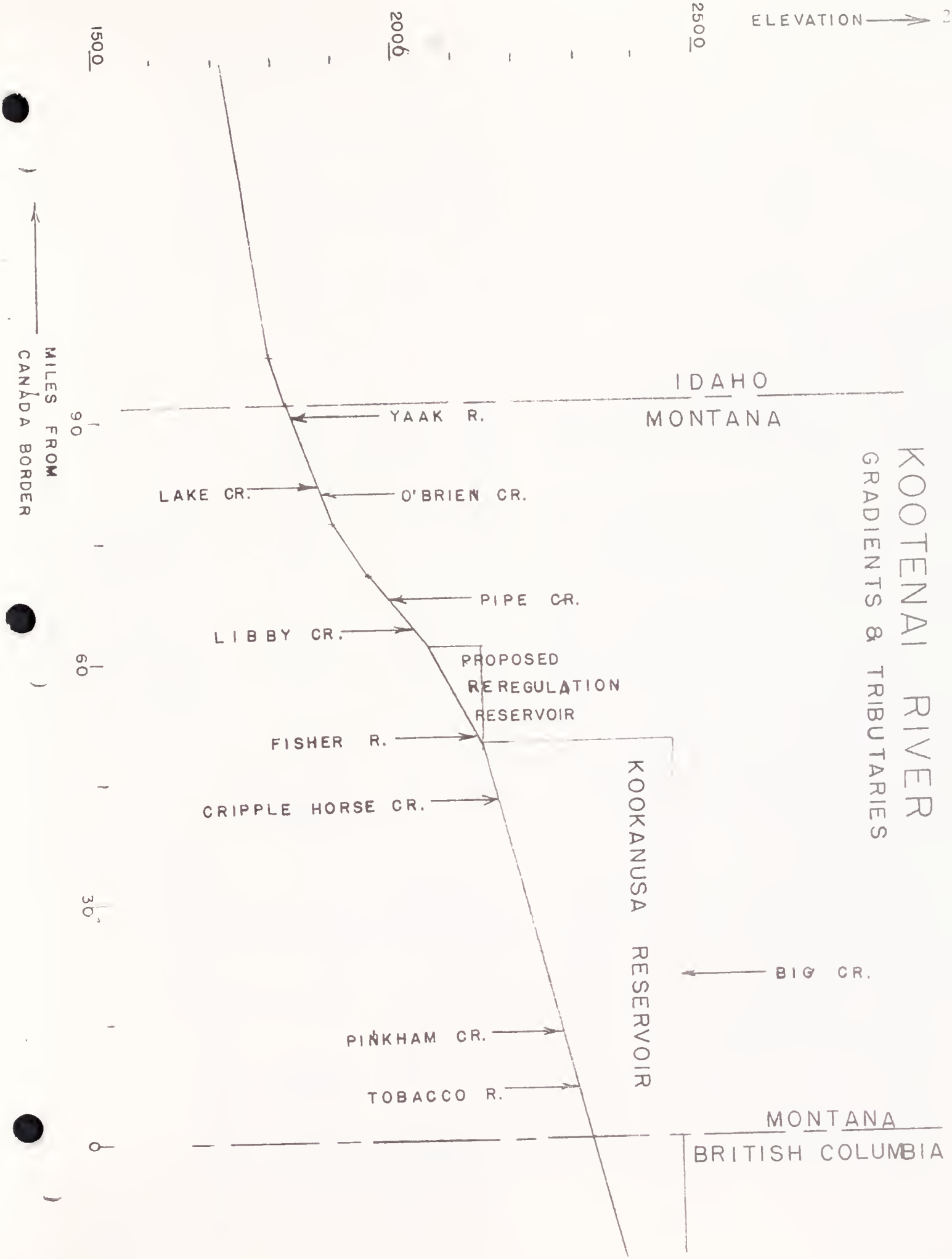

KOOTENAI RIVER
GRADIENTS & TRIBUTARIES
ELEVATION
1500
2000
2500
MILES FROM CANADA BORDER
90
60
30
0
IDAHO
MONTANA
YAAK R.
LAKE CR.
O'BRIEN CR.
PIPE CR.
LIBBY CR.
PROPOSED REREGULATION RESERVOIR
FISHER R.
CRIPPLE HORSE CR.
KOOKANUSA RESERVOIR
BIG CR.
PINKHAM CR.
TOBACCO R.
MONTANA
BRITISH COLUMBIA

TABLE 6 - DESCRIPTIVE DATA, KOOTENAI DRAINAGE SUB-BASINS

HYDROLOGY SUMMARY

KOOTENAI SUB-BASINS

Drainage Basin/Sub-basin	U.S. Geol. Survey Gage Station No.	Drainage Area (mi^2)	Discharge (cfs) Avg.	Max.	Min.	Period of Records
Kootenai entering Montana	12,3[illegible],[illegible]	7,660	1[illegible],520	98,2[illegible]	[illegible]4	1930 - present
Tobacco River, 6 mi. above mouth	12,301,30[illegible]	44[illegible]	28[illegible]	2,32[illegible]	2[illegible]	1958 - present
Fisher River, [illegible].8 mi. above mouth	12,302,[illegible]	838	Approx. 52[illegible]	[illegible],56[illegible]	75	1967 - present
Flower Creek, 1.0 mi. above mouth	12,303,1[illegible]	15	28	305	4	1960 - present
Yaak River, [illegible].2 mi. above mouth	12,304,500	766	927	12,5[illegible]	80	1910 - 1916 and 1956- present
Kootenai leaving Montana	12,305,000	11,7[illegible]	14,05[illegible]	123,000	[illegible]6	1928 - present

TABLE 7

SUMMARY OF U.S. GEOLOGICAL SURVEY STREAMFLOW GAGING STATIONS

Kootenai River Drainage Basin

Station Name	U.S. Geol. Survey Station No.	Location Description			Period of Record
		Longitude	Latitude	Legal *	
Kootenay River at Newgate, B.C.	12,30[illegible]	115°[illegible]'24"	49°[illegible]'52"	Not applicable in Canada	193[illegible] to present **
Tobacco R. near Eureka, Montana	12,3[illegible],3[illegible]	115°[illegible]'13"	48°53'37"	36N27W09DDD	1958 to present
Kootenai R. near Rexford, Mont.	12,301,500	115°13'37"	48°52'28"	36N28W21BAD	1929-194[illegible] & 1967-1971 **
Kootenai R. at Warland Bridge near Libby, Mont.	12,3[illegible]	115°17'[illegible]2"	48°30'00"	32N29W34AAB	1961 - 1971 **
Wolf Creek near Libby, Mont.	12,301,9[illegible]	115°16'25"	48°14'00"	29N29W35BCA	1967 - present
Fisher River near Libby, Mont.	12,302,[illegible]55	115°18'5[illegible]"	48°21'20"	30N29W21BAB	1967 - present
Kootenai River at Libby, Mont.	12,303,000	115°33'[illegible]8"	48°24'[illegible]3"	31N31W34CDC	1910 - present
Flower Creek near Libby, Mont.	12,303,1[illegible]	115°36'2[illegible]"	48°2[illegible]'41"	3[illegible]N31W10DDB	1960 - present
Yaak River near Troy, Mont.	12,[illegible],5	115°58'[illegible]0"	48°33'43"	32N34W05DDA	191[illegible]-1916, & 1930 - present
Kootenai R. at Leonia, Idaho	12,3[illegible]	116°[illegible]2'47"	48°37'[illegible]4"	33N34W2[illegible]BB	1928 - present

* See attached "System for Geographic Location of Features" for explanation, Appendix [illegible]

** These stations inundated by Hoocanusa Reservoir in 1972.

VII. WATER QUALITY

Water quality in the Kootenai drainage in Montana is generally excellent, and is typical of sparsely developed cold water streams in mountainous terrain. Certain problems have been identified, however, and are described on Page 2. The data reviewed for this plan was collected at some 37 stations in Montana, by several agencies.

Canadian Influences

Chemical analyses show that water quality in the Kootenai basin is good to excellent except in the main Kootenai River, which is affected by Canadian industrial discharges. Industrial discharges in Montana are limited to one, treated sewage discharges are limited in number to four, and dilution factors in the Kootenai River are large.

Typical water quality data from the Kootenai River water quality data is shown in Table 9. The following is a quote from a Corps of Engineers report (Ref. 6) regarding water quality in the Kootenai River.

> "Preliminary analysis of chemical constituents of the Kootenai River indicated that construction activities at Libby Project have not changed the chemical makeup of the river system. The analyses did reveal, though, that there is a high concentration of phosphorus in the Kootenai River entering the Libby Reservoir area from Canada. A review of work conducted by Canadian fishery and pollution agencies indicates that high phosphorus concentrations are originating in the St. Mary's River, a tributary of the Kootenai River. Consolidated Mining and Smelting, Inc., has fertilizer and mining operations on this river. Phosphate concentrations in excess of 0.01 mg/l (parts per million) are known to cause substantial algae blooms in lakes and reservoirs. Mean phosphorus concentrations of 0.5 mg/l have been found in the Kootenai River at the Rexford station, indicating that an algae problem will very probably be forthcoming with the filling of Libby Reservoir unless action is taken to reduce the level of this nutrient in reservoir inflow."

Concern over phosphorus enrichment of the Kootenai River from Canada has been voiced for some time. It is recognized that some phosphorus originates naturally from the phosphorus rich Phosphoria Formation (a phosphate bearing geological strata) in Canada, but most of the nutrient originates in industrial discharges (Figure 3 and Table 9). Montana has no control or authority over Canadian discharges even though the end effect could be heavy eutrophication of Koocanusa Reservoir.

The U. S. Corps of Engineers is engaged in an extensive water quality monitoring program to assess the effects on the Kootenai River of the Canadian discharges. The Corps has, in fact, assumed primary responsibility for water quality in the Montana portion of the Kootenai River and has been dealing directly with the Canadian authorities in this regard.

According to a Corps of Engineers spokesman (Ref. 33), the Corps has been dealing with the British Columbia Pollution Control Branch regarding industrial pollution controls for discharges affecting the Kootenai River.

TABLE 8

WATER QUALITY SAMPLING STATIONS

AGENCY	STATION NUMBER	LOCATION	LOCATION DESCRIPTIONS: LONGITUDE	LATITUDE	LEGAL	PARAMETERS MEASURED	PERIOD OF TESTING
Mont. Fish & Game	Ross Cr. 5	Ross Cr. ab. Bull [illegible]	115°[illegible]	[illegible]	28N33W08ADA	Temp., S.C., pH, SAR, Ca, Mg, Na, K, Fe, Mn, Cu, Zn, Ni, HCO_3,	monthly Calendar yr. 1971
"	Lake Cr. 2	Lake Cr. d/s [illegible]	[illegible]	[illegible]	29N33W06DDA	CO_3, SO_4, Cl, NO_3, F, SiO_2, Hard., Alk. TDS, Cd, OH	"
"	Lake Cr. 1	Lake Cr. ab. U.S. Hwy 2	115°51'31"	48°22'53"	30N33W08BBC	(for all 3 stations)	"
Mont. Health & Env. Sci	[illegible]	Tobacco R. nr. Eureka	[illegible]	[illegible]	36N27W08CBC	pH, Temp. Cond. TDS (Calc.), Hard., CO_3, HCO_3, OH, SAR, Ca	Bi-monthly 10/73-6/74
"	[illegible] 21	Fisher R. nr. Libby	[illegible]	[illegible]	27N29W29CCB	Mg, Na, K, Fe, Cl, SO_4, NO_3, PO_4, Air temp., S.S.,	"
"	KWQ 32	Libby Cr. ab. St. Regis Co.	[illegible]	[illegible]	30N31W14BBA	BOD_5, Tot. Coliform, Fecal Coliform, Turbidity, D.O.,	"
"	KWQ [illegible]	Libby Cr. nr. mouth	115°32'15"	48°23'25"	30N31W03DAD	C.O.D., Pb, Cu, Hg, As, Zn, Cd, T.O.C., NH_3,	"
"	KWQ 34	Flower Cr. at Libby	115°33'35"	48°23'15"	30N31W04DAA	(Measured for all stations)	"
"	KWQ 35	Parmenter Cr. nr. Libby	115°34'30"	48°23'55"	31N31W33CDC	"	"
"	KWQ 36	Lake Cr. near Troy	115°52'45"	48°26'58"	31N33W18CBB	"	"
"	KWQ 37	Yaak R. near Troy	115°58'12"	48°33'41"	32N34W05DDA	"	"
"	KWQ 38	Ross Cr. ab. Bull Lake	115°52'10"	48°12'24"	28N33W08ADB	"	"
"	KWQ 39	Callahan Cr. at Troy	115°53'25"	48°27'24"	31N34W13ABB	"	"
"	KWQB MS01	Libby Sewage Effluent	115°33'16"	48°23'57"	31N31W03BBA	BOD, pH, sp. cond., Temp., Fecal Coliform, T.S.S.	"
"	KWQB MS02	Eureka Sewage Effluent	115° 3'1"	48°52'45"	36N27W14CDB	"	"
"	KWQB PS01	St. Regis Co. Sewage	115°32'24"	48°23'25"	30N31W03DAB	"	"
"	KWQB [illegible]S02	BelleVue T.C. Sewage	115°35'21"	[illegible]	31N31W32DBB	"	"
"	KWQB ID01	St. Regis Co. Log Pond	115°32'18"	48°23'23"	30N31W03DAA	Nutrients, BOD, Coliform, Color, COD, Oils, Phenols, Cond., Temp	"
"	KWQB ID02	St. Regis Co. Steam Cond.	115°32'24"	48°23'25"	30N31W03DAB	pH, S.S., Q. (Measured for both stations)	"
U.S. Geol. Survey	12-3013	Tobacco R. nr. Eureka	115°[illegible]	48°[illegible]3'27"	36N27W09DDB	Each station has own set of parameters *	1967-71
"	12-3015	Kootenai R. nr. Rexford	[illegible]	48°[illegible]2'23"	36N28W21BAD	Most analyses quite complete except as noted.	1967-[illegible]
"	12-3[illegible]5	Kootenai R. @ Warland	115°17'02"	48°3[illegible]'00"	3[illegible]N29W34AAB	Temperature only	1962-71
"	12-301[illegible]33	Kootenai R. d/s Libby Dam	115°1[illegible]'2[illegible]"	48°22'[illegible]"	30N29W17AD	See note above	1967-71
"	12-[illegible]	Fisher R. ab. Wolf Cr.	115°16'2[illegible]	[illegible]	28N29W01[illegible]	See note above	1967-70
"	12-3[illegible]	Wolf Cr. nr. Libby	115°[illegible]7'22"	[illegible]4'01"	29N29W34AD	See note above	1967-70
"	12-3025	Fisher R. nr. Jennings	115°17'3[illegible]"	[illegible]14'33"	29N29W27CAB	Temperature only	1963-6
"	1[illegible]-2[illegible]	Fisher R. near Libby	115°[illegible]	[illegible]21'[illegible]"	30N29W21BDD	See note above	1967-71

TABLE 8
WATER QUALITY SAMPLING STATIONS (Cont.)

AGENCY	STATION NUMBER	LOCATION	LOCATION DESCRIPTION: LONGITUDE	LATITUDE	LEGAL	PARAMETERS MEASURED	PERIOD OF TESTING
U.S. GEOL. SURVEY	12-3000	Kootenai R. at Libby	115°32'48"	48°23'52"	30N31W03AB	See note above	1969-71
"	12-3045	Yaak R. nr. Troy	115°58'00"	48°33'43"	32N34W05DCA	Temperature only	1963-71
Corps of Engineers (pre-Libby Dam)	NO NUMBERS FOR THESE STATIONS	Kootenai R. nr. Rexford	115°13'37"	48°52'28"	36N28W21BAD	Parameters vary somewhat, but generally include the following:	1968-70
"		Kootenai R. nr. Warland	115°17'02"	48°39'00"	32N29W34AAB	Q. Temp., Sediment, SiO_2, Fe, Ca, Na, K, Mg, HCO_3, Hard,	1968-70
"		Kootenai R. d/s Libby Dam	115°19'20"	48°22'[illegible]"	30N29W17AD	CO_3, Alk., SO_4, Cl, F, NO_3, PO_4-Ortho, Total P, B, Sp.	1968-70
"		Wolf Cr. nr. mouth	115°17'02"	48°14'01"	29N29W34AD	cond., S.A.R., Color T.D.S., pH, aquatic insect an-	1968
"		Fisher R. ab. Wolf Cr.	115°16'20"	48°13'00"	28N29W01D	alyses. (measured for all stations)	1968
"		Fisher R. below Wolf Cr.	exact location not known			"	1968
"		Fisher R. above mouth	115°18'40"	48°21'02"	30N29W21BDD	"	1968
"		Kootenai R. near Libby	115°32'48"	48°23'52"	30N31W03AB	"	1968-70
Corps of Engineers		Koocanusa Res. nr. Canada	Approximate locations shown on maps,			Very extensive monitoring, including all of the above	1972-present
(Post-Libby Dam)		Koocanusa Res. d/s Rexford	but exact locations not known.			plus algal bioassays, additional parameters, sampling	1972-present
"		Koocanusa Res. nr. Volcour	To be described in			at varying depths, etc.	1972-present
"		Koocanusa Res. @ Libby Dam	future Corps Reports			"	1972-present

For complete listing of parameters, see "Water Resources Data for Montana, Part 2 Water Quality Records," published annually

"Period of testing" is misleading, as parameters and frequencies may vary from year to year. Here the term refers to the period when any water quality work was in progress

A recent communication from the Corps of Engineers to the Montana Department of Health and Environmental Sciences (Ref. 46, 47) specifically outlines controls to be implemented at COMINCO Ltd. to reduce phosphorus discharges to the Kootenai River in Canada. Pertinent facts from the correspondence are as follows:

1. COMINCO Ltd is planning to spend $800,000 to recirculate phosphorus rich wastewaters and reduce phosphorus discharges to the Kootenai River.

2. Phosphorus discharges to the Kootenai River will be reduced by 80%.

3. The agreed time schedule for having recovery facilities in operation is July 1, 1974.

Background Data

As indicated on the sampling stations map, a number of Kootenai tributaries are being, or have been, monitored for water quality. These tributaries have been monitored for varying reasons.

(a) Wolf Creek & Fisher River were extensively monitored by the Corps of Engineers and USGS (Ref. 6, 7, 14) to determine the effects of construction and channelization on water quality and the aquatic communities. The construction was for a railroad relocation which was a direct result of the construction of Libby Dam. While few permanent water quality changes were noted, it was found that aquatic insect populations suffered. This type of effect on other streams is reflected in a Montana Fish and and Game Department publication (Ref. 19) which showed stream alterations to reduce average trout populations by 80 percent and whitefish populations by 90 percent. Of the thirteen streams studied, about one-quarter of the total stream alteration was due to railroad construction like that on Fisher River and Wolf Creek.

(b) Yaak River, Lake Creek, Ross Creek, Tobacco River have been monitored by several agencies primarily to establish base level data. Lake and Ross Creeks may be affected by future mining plans and were, therefore, tested for base data.

(c) Libby Creek, Flower Creek, Parmenter Creek, Callahan Creek, all small tributaries of the Kootenai, were sampled primarily to determine the effects of housing development on water quality and to bring out possible local problems not of general concern to the entire basin. Libby Creek also was analyzed in conjunction with a log mill operation which has occasionally discharged to the creek in the past.

(d) Sources - Waste flows from municipal and industrial sources were also sampled as discussed in Section V of this plan.

Nitrogen (Air) Supersaturation

As mentioned in Section V, Libby Dam has caused nitrogen supersaturation problems and resulting fish kills since it commenced operations in 1972. Nitrogen supersaturation problems occur when water, cascading down improperly designed spillways, physically entraps air, plunging it to depths where pressure is

TABLE 9

KOOTENAI RIVER BASIN

TYPICAL, LONG-TERM WATER QUALITY SUMMARY

NUMBER	SAMPLING STATION DESIGNATION	SAMPLING SITE LOCATION	DATES SAMPLED	FLOW (cfs)	TEMPERATURE (°C)	pH (S.U.)	DISSOLVED CALCIUM (Ca)	DISSOLVED MAGNESIUM (Mg)	DISSOLVED SODIUM (Na)	DISSOLVED POTASSIUM (K)	BICARBONATE (HCO_3)	CARBONATE (CO_3)	SULFATE (SO_4)	CHLORIDE (CL)	NITRATE (NO_3)	FLUORIDE (F)
1	Tobacco River nr Eureka	36N27W09DD8	1967-1971 1973-1974	2e3	4.6	8.0	40	15	3	0.7	171	-	-	0.8	0.2	
2	Kootenai R. nr Rexford	36N28W21BAD	1967-1971	13,2[illegible]3	6.2	7.7	43	11	3	0.7	142	0	42	2.8	[illegible]	
3	Kootenai R. at Warland	32N29W14AA3	1968-1970	--	9.9	8.0	--	--	--	--	--	--	--	--	--	--
4	Wolf Cr. nr mouth	29N29W34AD	1968-1970	114	8.1	7.7	23	5	7	2.4	103	0	10	1.8	0.2	[illegible]2
5	Fisher R. nr Libby	27N29W29CCB	1971-1972	612	7.1	7.6	19	7	3	1.3	97	[illegible]4	5	0.8	0.03	
6	Kootenai R. at Libby	30N31W[illegible]AB	1969-1971	11,633	6.9	7.8	37	9	2	0.6	95	--	29	1.[illegible]	[illegible]	
7	Libby Cr. nr mouth	3[illegible]N31W[illegible]AD	1973-1974	--	--	7.6	12	-	2	--	54	0	4.5	0.5	[illegible]	--
8	Flower Cr. nr mouth	3[illegible]N31W4DAA	1973-1974	28	--	7.0	7	2	1	--	27		3.5	0.5	[illegible]	--
9	Farmester Cr. nr mouth	31N31W33CBC	1973-1974	--	--	7.8	8	4	1	--	3[illegible]	0	[illegible]	0.1	[illegible]7	--
10	Lake Cr.	29N33W[illegible]6BDA	1971	--	8.3	7.2	5	2	0.6	0.2	34	0	3.3	0.5	[illegible]	
11	Ross Cr.	28N33W[illegible]8ADA	1971	263	5.0	7.2	6	1	[illegible].3	0.2	26	0	2	0.3	[illegible]	--
12	Callahan Cr.	31N34W13ABB	1973-1974	--	--	6.9	4	1	2	--	18	0	6	0.3	[illegible]	--
13	Yaak R. nr mouth	32N34W[illegible]6DDA	1973-1974	927	--	8.0	16.8	[illegible].1	3.0	--	66	0	14	[illegible]5	[illegible]	--
14	Kootenai R., Leonia, ID		1969-1972	11,857	7.7	8.0	33	9	2.9	0.8	118	1.8	26	2.7	5	
15	Fisher R ab. Wolf Cr.	28N29W01D	1969-1970	467	8.8	7.7	18	7	2.4	0.8	92	0	4	0.6	[illegible]	

No.	[illegible]	[illegible]	[illegible]	[illegible] °C	[illegible]	[illegible] (at 21°C)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	TOTAL IRON (Fe)	TOTAL ZINC (Zn)	TOTAL COPPER (Cu)	TOTAL CADMIUM (Cd)	ADDITIONAL PARAMETERS AND REMARKS
1	[illegible]	[illegible]	--	150	159	22	[illegible]	15	---	[illegible]		[illegible]	2	[illegible]	[illegible]	--
2	2.5	[illegible]	--	--	154	117	[illegible]	0.123	7	---		.41	0.02	.01	[illegible]	
3	--	--	--	--	--	[illegible]	300	---	2-1[illegible]	--	--	--	--	--	--	
4	[illegible]	--	--	[illegible]	[illegible]	84	185	0.322	21	---	--	.12	[illegible]	[illegible]	0	
5	[illegible]	--	94	[illegible]	[illegible]	[illegible]	161	[illegible].136	9	--	--	[illegible]	0.011	[illegible]	0	
6	.22	--	--	151	[illegible]	274	---	15	--	21	0.47	.13	[illegible]	[illegible]		
7	< 0.03	77	2.2	48	44	55	[illegible].1	--	2.7	2	--	--	--	--		
8	<0.03	41	--	26	22	62	0.1	--	3.1	0	--	--	--	--		
9	< 0.03	59	--	37	31	83	0.1	--	2.8	1	--	--	--	--		
10	--	56	--	28	28	57	[illegible].7	--	--	--	0.[illegible]2	0.00	0.[illegible]	0.00		
11	--	40	--	21	21	46	0.[illegible]6	--	--	--	0.02	0.00	0.00	0.00		
12	< .03	3	--	15	14	[illegible]	0.2	--	2.7	1	--	--	--	--		
13	13	1[illegible]	--	[illegible]	[illegible]	77	0.2	0.5	2.3	3	--	--	--	--		
14	[illegible].5			135	97	2.6	0.1[illegible]	8			0.43	0.04	[illegible].2	[illegible]		
15	--	--	2	73	76	151	0.111	13	--	--	0.[illegible]3	--	--	--		

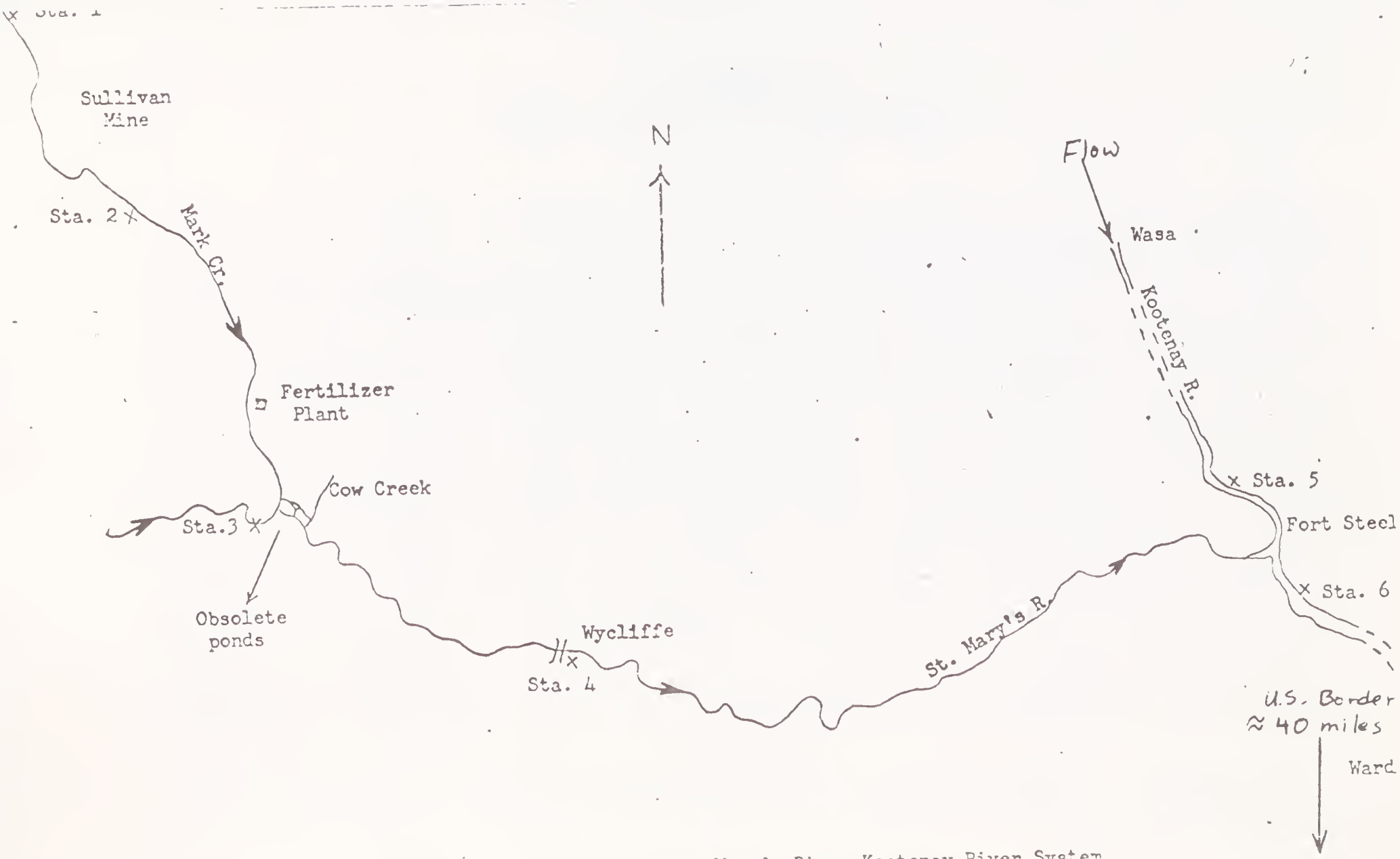


Figure 3 Sketch of St. Mary's River-Kootenay River System in the Kimberley area, showing location of bottom sampling stations during October, 1965 - March, 1966 survey.

increased enough to force it into solution in the water. The air at supersaturated levels causes physiological distress and death in fish much like "the bends" which strikes divers who have been breathing air at substantial depths and pressure and who then surface too rapidly, thus allowing deadly air bubbles to form in the blood stream.

Plans are being formulated by the Corps of Engineers to construct a re-regulation dam several miles below Libby Dam to stabilize river flows, and to generate additional power. It is thought (Ref. 37) that this reservoir will make the air supersaturation problem even worse, as it will increase the water depth below Libby Dam allowing the air to stay in solution longer than in the normally shallow Kootenai River. Also, the re-regulation dam spillway could add to the supersaturation problem unless it is properly designed. The date to start construction of the re-regulation dam is tentatively set at about 1978, and the Corps of Engineers reportedly is investigating design options to lessen the air problems.

Short of major construction at Libby Dam, little can be done to lessen the nitrogen (air) supersaturation problems existing there. The Corps of Engineers is considering structural modifications to lessen the problems, but other problems must be considered concurrently. For example, if the "deep plunge" below the spillway is eliminated, some other means must be devised to dissipate the water energy to prevent heavy erosion below the structure.

It has generally been assumed that the nitrogen problems below Libby Dam will be greatly reduced after the installation of power generators. The first four generators, capable of handling about 20,000 cfs of water are proposed to be in operation by about 1976, and four more are to be installed later. Four generators will be capable of bypassing most of the Kootenai River flow around the "deep plunge" spillway, except during heavy spring flows. It would thus be assumed that much of the supersaturation problem would be eliminated.

The biological effects of the air supersaturation below Libby Dam have been documented (Ref. 38) and the effects have been substantial. Nitrogen supersaturation levels vary somewhat with flow as shown below (Ref. 37):

% Saturation

Flow (cfs)	Libby Dam	Libby	Troy	Idaho-Canada Border
30,000	140		115-120	110-114
Minimum flow	140	110-115		

These values exceed maximum allowable values in the Montana Water Quality Standards from Libby Dam to the Montana-Idaho border.

As a result of the air supersaturation, major fish kills have been reported for at least ten miles below Libby Dam (Refs. 37, 38). Symptoms of nitrogen poisoning in fish have been observed below the town of Troy. In a fish

population study in a 13,000-foot section of the Kootenai River, beginning some 2½ miles below Libby Dam, it was found that some 38,000 whitefish, over six inches in length, were present before Libby Dam began spilling water over the spillways. One year after such operations, the investigators could not find enough whitefish to make a census estimate. Migratory whitefish spawning runs in the nearby Fisher River were also found to suffer both in numbers and in age of individual fish, reflecting the massive damage to whitefish populations in the main Kootenai River.

Because of the air supersaturation problems, the Kootenai River from Libby Dam to the Montana-Idaho border has been designated a water quality limited segment.

VIII. WASTE DISCHARGE PERMITS

In the recent past, the U. S. Environmental Protection Agency (EPA) issued waste discharge permits in the State of Montana. These permits were being issued pursuant to the National Pollutant Discharge Elimination System (NPDES) created by the Federal Water Pollution Control Act Amendments of 1972 (FWPCAA of 1972). To eliminate duplication of effort, the State of Montana applied to EPA for the authority to issue NPDES permits in Montana. Section 402 of the FWPCAA of 1972 provides that states, with adequate water pollution control program elements, may apply for and receive authority from the EPA to issue permits under the NPDES in their own states. Montana made the necessary revisions to the state water pollution control laws during the 1973 legislative session to provide statutory authority for administration of the NPDES program in Montana. In addition, the Board of Health and Environmental Sciences has adopted a rule entitled the Montana Pollutant Discharge Elimination System (MPDES). The MPDES rule provides the additional program elements needed by the state to adminiter the NPDES program. Montana has now been given the authority to administer the permit program.

Federal permits issued by the EPA will serve as state MPDES permits until their date of expiration. All state MPDES permits issued will meet the minimum requirements of EPA. All four NPDES permits required in the Kootenai basin have been issued under the MPDES program and are in effect. These entities are:

1. City of Libby, municipal sewage
2. Town of Eureka, municipal sewage
3. Belle Vue Trailer Court, municipal sewage
4. St. Regis Paper Co., log pond effluent, steam condensate effluent, and domestic sewage plant

These waste sources are discussed more fully and pertinent data tabulated in Section V of this plan.

Information relative to the existing state MPDES permits is shown on the following page.

1. LIBBY - MPDES Permit MT-0020494. Expiration Date 6/30/79

PARAMETER	Immediate Conditions		Future Conditions (7/1/77)	
	30 Day Period	7 Day Period	30 Day Period	7 Day Period
BOD_5 (mg/l)	170	200	30	45
TSS (mg/l)	NA	NA	30	45
Fecal Coli (#/100ml)	NA	NA	200	400

Also, Cl_2 less than 0.5 ppm. Monitoring: Flow daily, BOD weekly, TSS weekly Fecal Col. Weekly, pH Daily, Cl_2 Daily

2. EUREKA - MPDES Permit MT-0021725. Expiration Date 6/30/79. Note: Eureka's time schedules and conditions are identical to those shown for Libby, above.

3. BELLE VUE TRAILER COURT - MPDES Permit MT-0023621. Expiration Date 12/31/79

PARAMETER	Immediate Conditions		Future Conditions (7/1/75)	
	30 Day Period	7 Day Period	30 Day Period	7 Day Period
BOD_5 (mg/l)	80	100	30	45
TSS (mg/l)	80	100	30	45
Fecal Coli (#/100ml)	NA	NA	200	400

Also, Cl_2 less than 0.5, pH between 6 & 9. Monitoring (future): Discharge monthly, BOF 4/year, TSS 4/year, Fecal Col. , pH, Cl_2, all 4/year

4. ST. REGIS PAPER CO. - MPDES Permit MT-0000221. Expiration Date 6/30/79

PARAMETER	Immediate Conditions		Future Conditions (1/1/77)	
	Daily Average	Daily Max.	Daily Average	Daily Max.
(1) BOD_5 (lb/ day)	720	1750	40	80
(1) TSS (lb/day)	2400	4500	40	80
(1) pH (std. units)	6-9	6-9	6-9	6-9
(2) BOD_5 (lbs/day)	NA	NA	13	26
(2) TSS (lb/day)	NA	NA	25	50

Where (1) refers to log pond + cooling water + plywood pond + sewage plant + scrubber washwater, and (2) refers to scrubber water before discharge to log pond. Additional requirements: For discharge (1), (future requirement), fecal coli. 200/100 ml, 30 day mean; 400/100 ml, 7 day mean. Monitoring: Discharge (1), (present), flow weekly, BOD twice monthly, TSS twice monthly, Temp. twice monthly, Cl_2 weekly, pH twice monthly; (future), flow continuously, BOD twice monthly, TSS weekly, fecal quarterly, Cl_2 5 per week. Discharge (2) (future), flow weekly, BOD monthly, TSS weekly.

Other entities in the Kootenai drainage basin include the W. R. Grace Company vermiculite mine near Libby, the St. Regis Company mill in the town of Troy, and the town of New Rexford. None of the three entities have existing or planned waste discharges and therefore will not require discharge permits.

One potential waste source which could require a discharge permit is an ore mill and concentrator being contemplated by the American Smelting and Refining Company for their Spar Lake Prospect in the headwaters of Lake Creek. No dates or firm plans for the development of this mine and concentrator have been submitted to the State Department of Health and Environmental Sciences, and no application has been made for state or federal waste discharge permits.

IX. WASTE LOAD ALLOCATIONS

According to EPA guidelines, waste load allocations must be made only for those waters which are water quality limited, and in which water quality will not meet state standards following installation of secondary treatment for municipal sources and best practicable treatment for industrial sources. Referring to Montana Water Quality Standards it is apparent that all areas of questionable water quality in the basin are classified as B-D_1 waters. (See Appendix II for detailed water quality standards).

The B-D_1 stream classification essentially is stated as follows:

Total Coliform - 1,000 organisms/100 ml with less than 20% of samples to exceed this amount in any 30-day period

Fecal Coliform - 200 organisms/100 ml with less than 10% of samples to exceed 400/100 ml in any 30-day period

Dissolved Oxygen at least 7.0 mg/l (milligrams per liter)

pH - Induced variation within range of 6.5 - 8.5 is to be less than 0.5 pH unit

Turbidity - Maximum allowable increase over natural conditions is 5 JCU.

Temperature - Complicated criteria; see Appendix II

Sediment, Toxic Substances - See Appendix II

True Color - Maximum allowable increase over natural conditions is 5 units

B-D_1 waters include the main Kootenai River, the Tobacco River, and Libby Creek, which are the only waters in the basin receiving municipal or industrial waste discharges. These streams are discussed below.

Tobacco River: Water quality data collected and analyzed for stations downstream of Eureka indicated slight anomalies of strontium and aluminum, total coliform organisms as high as 1,200 organisms/100 ml (with fecal coliform at 400 organisms/100 ml) and maximum temperatures in August as high as 22°C. As there are no waste sources with significant strontium or aluminum, the slight anomalies (Sr to 0.17 mg/l and Al to 0.50 mg/l) are believed to be naturally occurring. As there are no thermal discharges to the Tobacco River, the fairly high temperatures associated with minimum streamflows are also naturally occurring. The high bacterial counts slightly exceed State Water Quality Standards at least on occasions and are the result of a primary-treated sewage discharge from the Town of Eureka. Bacterial counts can be reduced by upgrading the sewage treatment to secondary treatment with chlorination. Thus, the Tobacco River is effluent limited and not water quality limited, and is not given a waste load allocation treatment in this plan.

Libby Creek - Water quality in Libby Creek is good, total coliforms reach 100 organisms/100 ml which is well within State Water Quality Standards. Libby Creek is discussed because the St. Regis Lumber Company has historically bypassed their log pond effluent while annually cleaning out the downstream

settling ponds. The bypassed effluent has exceeded state standards for turbidity. Under the pending EPA waste discharge permit, however, no further discharges to Libby Creek will be allowed. Hence, Libby Creek is effluent limited and is not given waste load allocation treatment in this plan.

Kootenai River: U. S. Geological Survey water quality data for the Kootenai River (Ref. 34) shows the following unusual characteristics:

Parameter	Mean Value	
	Kootenai at Rexford	Kootenai at Libby
Total N	0.31 mg/1	0.59 mg/1
Total PO_4	2.52 mg/1	- - - -
Ortho PO_4	0.56 mg/1	0.35 mg/1
Sulfate, SO_4	42.0 mg/1	29.2 mg/1
Fluoride	0.80 mg/1	0.58 mg/1
Iron, total	0.41 mg/1	0.47 mg/1

Various reports, discussed and referenced previously, attribute all of these water quality characteristics, except perhaps the total nitrogen, to Canadian industrial discharges. These values are difficult to evaluate in the context of Montana Water Quality Standards. It is not certain whether water quality of streams entering Montana from Canada should be taken as "naturally occurring" or not. Also, the primary problem is one of nutrient enrichment which is mentioned in the standards, but for which specific limits have not been stated. For example, the phosphate concentrations are high, presumably high enough to induce heavy algal blooms. However, such blooms have not yet occurred, and until they do, Montana Water Quality Standards will not be violated. Also, FWPCA's (Federal Water Pollution Control Administration) 1968 "Water Quality Criteria" (Ref. 35, p. 53) suggests a limit of 0.100 mg/1 total phosphorus in rivers, but this was never adopted by state or federal agencies. Also, sections of Montana Water Quality Standards require the degree of waste treatment to be based on present and anticipated beneficial uses of the receiving water, and to consist of at least "secondary" treatment. However, these treatment requirements apply only to Montana discharges and not to Canadian wastes.

Montana's Water Quality Standards also refer to Public Health Service drinking standards for toxic or deleterious substances. Apparently, the only chemical parameter in the Kootenai River exceeding the Public Health Service standards (Ref. 36) is iron. Average iron concentrations in the Kootenai River range from 0.41 mg/1 near Rexford to 0.47 mg/1 near Libby. This exceeds the U. S. Public Health Service recommended standard for iron (0.3 mg/1). The U.S.P.H.S. standard is for treated water and most conventional treatment processes would significantly reduce the iron concentration. Water from the Kootenai River therefore probably would easily meet the U.S.P.H.S. standards after treatment; thus, there would be no violation of water quality standards.

Nitrogen Supersaturation-Nitrogen, or air, supersaturation occurs below Libby Dam and is a direct result of the operation of the dam. This problem has been monitored by the Montana Fish and Game Department and the Corps of Engineers. Fish mortalities have resulted, as discussed in Section VII of this plan. Nitrogen supersaturation levels generally are about 140% below Libby Dam, and range between 110% and 114% over 100 miles downstream where the Kootenai River re-enters Canada from Idaho. Montana Water Quality Standards are being violated in the entire Kootenai River from Libby Dam downstream to the Montana-Idaho border. These standards prohibit activities which cause more than 110% saturation of any gas in state waters. Therefore, the Kootenai River from Libby Dam to the Idaho border is a water quality limited segment, from the standpoint of air supersaturation.

Waste Load Allocations for Kootenai River-As pointed out, the industrial Canadian discharges to the Kootenai do not specifically violate Montana water quality standards, although such may be the case if future algal blooms occur. The State of Montana has little or no control over such discharges, the Corps of Engineers has assumed primary responsibility for water quality in the Kootenai and there appears to be little reason to prepare a waste load allocation analysis as it could not be enforced. No Montana discharges or activities appear to be contributing significantly to the potential water quality problems and therefore need not be regulated except as in effluent limited segments. Control of Canadian industrial discharges by the Canadian authorities is outlined in Section VII of this plan.

Regarding nitrogen supersaturation below Libby Dam, state water quality standards are being violated, conditions may be worsened with the future construction of the Libby re-regulation dam, and the Kootenai below Libby Dam has been declared water quality limited. However, there is again little reason to prepare a waste load allocation analysis for the Kootenai River as the entire problem results from one source, Libby Dam, over which the State of Montana has little or no control. No known or anticipated discharges or operations under state control will contribute to the nitrogen supersaturation problem in the Kootenai River. If such a discharge or activity would be proposed in the future, this plan would have to be revised to assess the potential damage and treatment requirements before the state would approve the proposed activities.

Other Waters-All other surface waters in the Kootenai basin, including major tributaries, the Yaak and Fisher Rivers, are undeveloped except for sparse homesites, and have no known domestic or industrial discharges. A review of water quality data in tributaries of the Kootenai system indicates good to excellent quality with some exceptions due to natural turbid spring runoff.

In summary, in the few instances in the Kootenai Basin where state water quality standards are not being met, the problems are those of inadequate effluent control, and are not water quality limited or result from activities not under state control. As such, no waste load allocations are necessary for the Kootenai drainage basin.

Water Quality Segment Priorities-As indicated on page 36, the Kootenai River from Libby Dam to the Montana-Idaho border has been designated a water quality limited segment because of gas supersaturation from the Dam. Also, on page 28, nutrient levels in the entire Montana portion of the Kootenai River were discussed. This segment was not listed as a water quality limited segment because the primary nutrient source is in Canada, but the segment is discussed here relative to priorities, as problems are expected to result in Montana.

Both of the above problems are felt to be very significant, but because the gas problem occurs in Montana and is thus under some degree of control, this segment is designated as having the higher priority. The planning needs for these segments are discussed on page 43.

X. MANAGEMENT PLAN & STRATEGY

The basic goals for Montana's water quality management is to maintain and enhance water quality and to protect the public health and welfare. The mechanisms for achieving these goals include water quality monitoring, waste source monitoring, use of state and federal discharge permits, compliance plans, enforcement actions, state regulations involving land use control and administration of state and federal municipal grant programs.

The monitoring program for the Kootenai basin involves several agencies, state and federal, and is described in this plan. Results of the monitoring have been and will be scrutinized to check for problems or violations of water quality standards. Once a violation is discovered, follow-up studies will be conducted to definitely establish the source(s) of the problem and determine what courses of action may be followed to solve or minimize it.

Compliance plans can be formulated particularly in accordance with EPA deadlines for "best practicable treatment" for industries and "secondary treatment" for municipalities. Such plans may be included as part of the EPA waste discharge permits. It is important, in establishing compliance plans and schedules, that the following factors be considered:

1. Compliance with the plan must produce the needed improvements, that is, meet water quality standards, qualify as secondary or best practicable treatment, etc.

2. Time schedules must be reasonable and must conform with federal laws.

3. It should be determined that reasonable construction grants will be available to aid municipalities.

Specific compliance plans for the Kootenai basin are discussed in Section XII of this plan.

In the event a municipal or industrial entity, or any other entity, causing water quality problems in violation of state or federal laws, fails to cooperate or show reasonable progress toward solving a problem, legal action may be taken to stimulate action, impose fines, and/or recover damages that may have incurred.

Some state and federal regulations involving land use have a direct influence on protection of water quality. Present state subdivision laws [MAC 2.14(10)-S14340] include the following requirements:

1. Minimum subdivision lot size for individual water and sewer services is 1.0 acre, to reduce densities in unsewered areas using water wells. The result is low probability of groundwater contamination.

2. No subsurface sewer systems may be located within 100 feet of any surface waters, or within four vertical feet of the seasonal high water table.

3. No subsurface sewer systems may be located within the 100-year flood plain.

Federal laws administered by the Corps of Engineers and the Department of Housing and Urban Development (HUD) place further restrictions on 100-year flood plain development. Federal regulations and laws regarding use of public owned forest lands, lately in a considerable state of flux, have the potential for protecting or deteriorating surface waters where logging is practiced. Since 66% of the entire Kootenai drainage basin in Montana is in timber production, the best water quality situation would be total non-use of this land; and the worst situation would be total clear-cut. The actual situation will lie somewhere between these extremes; and silt loads, temperatures, seasonal low flows and nutrient concentrations in surrounded tributary streams will vary with the degree of logging activity.

The Environmental Protection Agency administers a grant program for the construction of municipal sewage facilities. This program will play a very important role in the upgrading of two municipal sewage facilities in the Kootenai, as the area is economically depressed. Sewage construction can not be expected to proceed unless grant monies are available.

As itemized on page 46, the communities of Eureka, Libby, Libby Flats and Troy will eventually require federal assistance in constructing an estimated total of $946,000 worth of sewerage and sewage treatment facilities. Planning requirements should be sufficiently satisfied with the completion of three Section 201 Facility Plans, one each for the following areas: Eureka, Libby and Libby Flats, and Troy.

The Eureka and Libby-Libby Flats facility plans are presently under way. The Troy area, which presently has no community sewage facilities, is a depressed area, with a diminishing economic base, and will probably not proceed with plans for sewage collection and treatment in the forseeable future.

Water Quality Segments-Planning Needs: The basic non-municipal planning needs in the Kootenai basin are related to gas supersaturation from Libby Dam, and elevated nutrient levels, primarily from Canadian sources. It is difficult to determine just what the planning needs relative to these problems are, as exhaustive cooperative studies by the Corps of Engineers and the British Columbia government have already been conducted, and others are still in progress. Additional studies have been conducted by the Montana Fish & Game Dept. Nevertheless, the two problems still persist. Latest indications are that considerable algal blooms have already occurred in the upper portions of Koocanusa Reservoir, and that the fish populations below Libby Dam have shown little improvement. Chances of improving the gas problem are excellent as installation of generators at Libby Dam are planned. The status of further improving Canadian nutrient discharges (treatment is thought to be effected already) is not known.

The Montana Department of Health and Environmental Sciences would endorse any further studies which would show promise of resulting in an early reduction of either of the above problems.

XI. SURVEILLANCE

A long-range water quality monitoring program is in progress by the U. S. Corps of Engineers for four stations on Koocanusa Reservoir (Figure 1). The parameters measured (Table 9) are concerned with water chemistry, nutrients, algal bioassays, sediment analyses, and heavy metals. These stations will adequately monitor the Kootenai River from the Canadian border to Libby Dam. In addition, the Corps of Engineers has contracted with the U. S. Geological Survey for water quality work on the Tobacco River below Eureka and the Kootenai River below Libby Dam. This program is funded on a year-to-year basis and presumably could be discontinued at any time although three years data have presently been accumulated.

To supplement the Corps of Engineers and USGS efforts, the Montana Department of Health and Environmental Sciences has established ten sampling stations on Kootenai River tributaries and six sampling stations at industrial and municipal waste sources. Continuation of sampling at these stations past the spring of 1974 will depend largely on the data accumulated. At this time, it is expected that at least five of the stream stations will be sampled quarterly until the Department and EPA are satisfied that all noteworthy trends and anomalies have been established. Waste sources will be periodically sampled until secondary treatment has been installed at all municipal discharges and best practicable treatment is employed at the industrial discharges. Thereafter, source monitoring will be reviewed with EPA and revised accordingly. Parameters measured will be in accordance with the EPA approved state pollution control plan (Ref. 20).

The U. S. Geological Survey operates 10 streamflow gaging stations in the Kootenai basin and intends to continue these stations. Three stations have been recently inundated by Koocanusa Reservoir, and in their place, reservoir stage readings are being made.

This proposed surveillance plan should:

1. Insure that industrial and municipal discharges are in compliance with discharge permits.

2. Monitor all major surface waters in the basin to assure compliance with water quality standards.

3. Provide base line and long-term data on water quality changes in the basin.

It should be noted that violations of water quality standards discovered in the monitoring program will be followed up with a study to determine sources and recommended improvements.

In addition to the above described monitoring, the British Columbia provincial government is currently monitoring the Kootenai River system at several stations between the Montana-Canada border and the location near Kimberley of the COMINCO industrial waste discharges. The precise locations of these stations are not known, but the monitoring program is extensive and is very similar to the Corps of Engineers' program described in this plan.

XII. MUNICIPAL FACILITIES INVESTMENTS

Treatment Requirements

As discussed briefly in Section X of this plan, time schedules have been established for upgrading municipal and industrial waste treatment (Ref. 43, 44). For the purposes of this discussion, the following terms are defined:

Secondary Treatment Requirements (EPA)

Minimum BOD_5 (5-day biochemical oxygen demand) reduction 85%
Minimum Suspended Solids reduction 85%
Maximum BOD_5 in effluent, less than 30 mg/l, monthly average
less than 45 mg/l, weekly average
Maximum Suspended Solids in effluent, less than 30 mg/l, monthly average
less than 45 mg/l, weekly average
Fecal Coliform in effluent, less than 200 organisms/100 ml, monthly basis
less than 400 organisms/100 ml, weekly basis
pH must be maintained between 6 and 9 in effluent.

B.P.T. - "Best Practicable Treatment" - The best practicable control technology currently available for the 1977 target date.

B.A.T. - "Best Available Technology" - The best available technology economically achievable for the 1983 target date. B.A.T. requirements will be at least as stringent as B.P.T. requirements and probably more so depending on technological improvements in treatment facilities.

No discharge of Pollutants - A good definition of this term has not been made. It refers to wording in the 1972 amended Federal Water Pollution Control Act (Ref. 43) which calls for the elimination of pollutants into the navigable waters of the U. S. by 1985. This elimination of pollutants is stated as a goal and not as a law. The wording could be defined as anything from no discharge (all land disposal) to best available treatment in 1985.

The Federal Water Pollution Control Act Amendments of 1972 established the following time schedules for upgrading waste treatment facilities (Ref. 43, 44):

Industries

B.P.T. by July 1, 1977
B.A.T. by July 1, 1983
No discharge of Pollutants by 1985 (goal)

Municipalities

Secondary Treatment by July 1, 1977
B.P.T. by July 1, 1983
No discharge of Pollutants by 1985 (goal)

Requirements for Water Quality Standards - Secondary sewage treatment requirements defined above, would suffice to meet water quality standards in the Tobacco River at Eureka and the Kootenai River at Libby. Water quality standards are presently not a factor at Troy or Libby Flats, as neither community has a sewage discharge to surface waters.

Municipal Investments

In accordance with the above federal requirements, it has been determined that several entities in the Kootenai drainage basin will require upgrading of treatment facilities. Facility investments, for the purpose of this study, have been estimated only for municipalities and not for industries. The following estimates are for meeting the July 1, 1977 secondary treatment requirements. Most of the estimated cost information was obtained from consulting engineers for the municipalities, but it must be stressed that in the present period of inflation and soaring prices, it is extremely difficult to project costs. This is particularly difficult considering that some of the municipalities have only preliminary ideas of what kind of treatment plant is desired, how large an area is to be served, or precisely what date bids are to be awarded. Nevertheless, the following estimated costs are suggested for upgrading municipalities (Ref. 20).

	Estimated Costs			
Municipality	Main Sewer Costs	Laterals Costs	Treatment and Outfall	Existing Treatment
Eureka	$ 30,000	$ 20,000	$200,000	Primary
Libby*	70,000	100,000	206,000	Primary
Libby Flats*	400,000	150,000	250,000	None
Troy	100,000	244,000	290,000	None

*Note: It is not likely that either Libby or Libby Flats would be financed by the Environmental Protection Agency unless the two entities combined their efforts into a single project. Because of EPA's cost-effective policies, it would have to be shown in the engineering reports (now termed "Section 201 Facility Plans") that more system could be provided per federal dollar with two separate sewage systems than with one combined system. If this could not be demonstrated, EPA would not fund the two proposed separate sewage systems, as the two areas are immediately adjacent to one another. Preliminary indications are that the two separate systems would cost much more than one single combined system/

For the purpose of equitably awarding grant funds where the needs are greatest, the State of Montana utilizes a priority system, based on EPA guidelines. The four entities discussed above have been rated on the Fiscal Year '74 priority list, with results as follows:

Entity	Priority Points	Priority Position in State (of 92 applicants)
Libby	44	13
Eureka	44	19
Troy	29	64
Libby Flats	29	66

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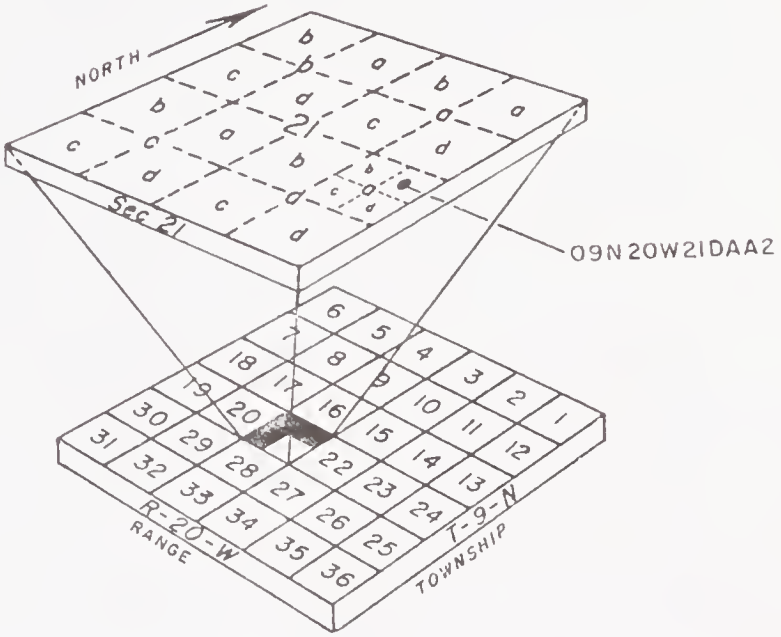
APPENDIX I

System for Geographic Location of Features

APPENDIX I

SYSTEM FOR GEOGRAPHIC LOCATION OF FEATURES

Wells, springs, water-sampling locations, and stream-gaging locations are assigned numbers based on the system of land subdivision used by the U. S. Bureau of Land Management. The number consists of twelve characters and describes the location by township, range, section, and position within the section. The figure below illustrates the numbering method. The first three characters of the number give the township, the next three characters the range. The next two numbers give the section number within the township, and the next three letters describe the location within the quarter section (160-acre tract) and the quarter-quarter section (40-acre tract), and the quarter-quarter-quarter section (10-acre tract). These subdivisions of the 640-acre section are designated a, b, c, and d in a counterclockwise direction, beginning in the northeast quadrant. If there is more than one feature in a 10-acre tract, consecutive digits beginning with 2 are added to the number. For example, if a water-quality sample was collected in sec.21,T.9N.,R20W, it would be numbered 09N20W21DAA2. The letters DAA indicate that the well is in the NE¼ of the NE¼ of the SE¼, and the number 2 following the letters DAA indicates there is more than one water-quality sampling location in this 10-acre tract.



APPENDIX II

Montana Water Quality Standards

MONTANA STATE DEPARTMENT OF HEALTH
AND
ENVIRONMENTAL SCIENCES

MAC 16-2.14(10)-S14480 WATER QUALITY STANDARDS

(1) Policy statement. The following standards are adopted to establish maximum allowable changes in water quality and establish limits for pollutants which affect prescribed beneficial uses of state waters. The department adopts as a rule the policy that best practicable treatment and control of waste, activity and flow is to be provided to maintain dissolved oxygen and overall water quality at the highest possible levels, and water temperatures, coliform bacteria concentrations, dissolved chemical substances, toxic materials, radioactivity, turbidities, color, odor and other deleterious substances at the lowest possible levels.

(2) Application of standards. The water quality standards are composed of water-use classifications [section (4)], water-use descriptions and specific water quality criteria [section (5)], and general water quality criteria [section (6)].

(a) General water quality criteria apply to all state waters except where in this rule specific water quality criteria are more applicable to a specific water-use classification.

(b) In order to carry out the objective of the rule, existing discharges to state waters shall be brought into compliance with the standards as soon as practicable, and in no case later than three years from the effective date of the rule.

(3) Definitions. Unless statutory definition or the context otherwise requires in this rule:

"Conduit" means any artificial or natural duct, either open or closed, for conveying liquids or other fluids.

"Dewatered stream" means a perennial or intermittent stream whose water has been removed for one or more beneficial uses.

"EPA" means the U. S. Environmental Protection Agency.

"Intermittent stream" means a stream or portion of a stream that flows only in direct response to precipitation; it receives little or no water from springs and no long-continued supply from melting snow or other sources.

"Naturally occurring" means conditions or material present from runoff or percolation over which man has no control or from developed land where all reasonable land, soil and water conservation practices have been applied. Conditions resulting from dams in existence as of July 1, 1971 are natural.

"Mixing zone" means that volume of state water wherein any pollutant may exceed allowable water quality standards.

"Pesticide" means insecticides, herbicides, rodenticides, fungicides or any substance or mixture of substances intended for preventing, destroying, controlling, repelling, altering life processes, or mitigating any insects, rodents, nematodes, fungi, weeds and other forms of plant or animal life.

"Residue" means oils, floating solids and sludge deposits.

"Sediment" means solid material settled from suspension in a liquid; mineral or organic solid material that is being transported or has been moved from its site of origin by air, water or ice and has come to rest on the earth's surface, either above or below sea level; or inorganic or organic particles originating from weathering, chemical precipitation or biological activity.

"Settleable solids" means inorganic or organic particles that are being transported or have been transported by water from the site or sites of origin and are settled or are capable of being settled from suspension.

"Sewer" means a pipe or conduit that carries wastewater or drainage water.

"State waters" means any body of water, irrigation system or drainage system, either surface or underground. This section shall not apply to irrigation waters where the waters are used up within the irrigation system and said waters are not returned to any other state waters. The term "state waters" as used in this rule does not include underground water.

"Storm sewer" or "storm drain" means a sewer that carries storm water and surface water, street wash and other wash waters, or drainage but excludes sewage and industrial wastes.

"True color" means the color of water from which the turbidity has been removed.

"Turbidity" means a condition in water or wastewater caused by the presence of suspended matter resulting in the scattering and absorption of light rays.

(4) Water-use classifications.

COLUMBIA BASIN

Clark Fork River Drainage

Clark Fork River:

Warm Springs drainage to Myers Dam	A-Open-D_1
Remainder of Warm Springs drainage	B-D_1
Silver Bow Creek drainage to Anaconda Company leach dump	B-D_1
Silver Bow Creek (mainstem) from the confluence of Blacktail Deer Creek to Warm Springs Creek	E-F

Yankee Doodle Creek drainage to and including the Butte water supply reservoir . . . . . A-Closed

Remainder of Yankee Doodle Creek drainage to Anaconda Company tailings pond . . . . . B-D_1

Blacktail Deer Creek drainage except portion of Basin Creek listed below . . . . . B-D_1

Basin Creek drainage to and including the Butte water supply reservoir . . . . . A-Closed

Remainder of Basin Creek drainage . . . . . B-D_1

All other tributaries to Silver Bow Creek from the confluence of Blacktail Deer Creek to Warm Springs Creek . . . . . B-D_1

Clark Fork River (mainstem) from Warm Springs Creek to Cottonwood Creek . . . . . C-D_2

Clark Fork River (mainstem) from Cottonwood Creek to the Little Blackfoot River . . . . . C-D_1

Tin Cup Joe Creek drainage to the Deer Lodge water supply intake . . . . . A-Closed

Remainder of Tin Cup Joe drainage . . . . . B-D_1

Clark Fork River drainage from the Little Blackfoot River to the Idaho state line except those portions of tributaries listed below . . . . . B-D_1

Georgetown Lake and tributaries above Georgetown Dam . . . A-Open-D_1

Flint Creek drainage from Georgetown Dam to Farm-to-Market Highway No. 348 bridge about one mile west of Philipsburg except those portions of tributaries listed below . . . . . B-D_1

Fred Burr Lake and headwaters from source to the outlet of the lake . . . . . A-Closed

Flint Creek (mainstem) from Farm-to-Market Highway No. 348 bridge about one mile west of Philipsburg to the Clark Fork River . . . . . B-D_1

South Boulder Creek drainage to the Philipsburg water supply intake . . . . . A-Open-D_1

Remainder of South Boulder drainage . . . . . B-D_1

All other tributaries to Flint Creek from Farm-to-Market Highway No. 348 bridge to the Clark Fork River . . . . . B-D_1

Rattlesnake drainage to the Missoula water supply intake . . . . A-Closed

Remainder of Rattlesnake drainage . . . . . B-D_1

Packer and Silver Creek drainage (tributaries to the St. Regis River) to the Saltese water supply intake . . . . . A-Open-D_1

Remainder of Packer and Silver Creek drainages . . . . . B-D_1

Ashley Creek drainage to the Thompson Falls water supply intake A-Closed

Remainder of Ashley Creek drainage . . . . . B-D_1

Pilgrim Creek drainage to the Noxon water supply intake . . . . A-Open-D_1

Remainder of Pilgrim Creek drainage . . . . . B-D_1

All tributaries of Clark Fork River not otherwise mentioned . . B-D_1

Flathead River:

Flathead River drainage (except tributaries in Glacier National Park or in nationally designated wild, wilderness or primitive areas) except tributaries and lakes or reservoirs listed below . . . . . B-D_1

Essex Creek drainage to the Essex water supply intake . . . A-Closed

Remainder of Essex Creek drainage . . . . . B-D_1

Snyder Creek (mainstem) through the community of Lake McDonald in Glacier National Park to Lake McDonald . . . . B-D_1

Stillwater River (mainstem) from but excluding Logan Creek to the Flathead River . . . . . B-D_2

Whitefish Lake and its tributaries . . . . . A-Open-D_1

Whitefish River (mainstem) from the outlet of Whitefish Lake to the Stillwater River . . . . . B-D_2

Haskill Creek drainage to the Whitefish water supply intake . . A-Open-D_1

Remainder of Haskill Creek drainage . . . . . B-D_1

Remainder of Whitefish River drainage . . . . . B-D_1

Remainder of Stillwater River drainage . . . . . B-D_1

Ashley Creek drainage to and including Smith (Kila) Lake . . . . B-D_1

Ashley Creek (mainstem) from Smith Lake to bridge crossing on the airport road about one mile south of Kalispell . . . . . B-D_2

Ashley Creek (mainstem) from bridge crossing on airport road to the Flathead River . . . . . E-F

All tributaries to Ashley Creek from Smith Lake to the Flathead River . . . . . B-D_1

Flathead Lake and its tributaries except Flathead River above the lake (as listed above), Swan River and portions of Hellroaring Creek as listed below, but including Swan Lake proper and Lake Mary Ronan . . . . . A-Open-D_1

Swan River drainage (except Swan Lake proper) . . . . . B-D_1

Hellroaring Creek drainage to the Polson water supply intake . . . . . A-Closed

Remainder of Hellroaring Creek drainage . . . . . B-D_1

(Simply as a note for clarification, the Flathead River below the highway bridge at Polson to Paradise is included in the B-D_1 classification of the Flathead River drainage listed above.)

Crow Creek drainage to road crossing at Section 16, T20N, R20W about 2.5 miles southwest of Ronan except the portion of Second Creek listed below . . . . . B-D_1

Second Creek drainage to the Ronan water supply intake . . A-Closed

Remainder of Second Creek drainage . . . . . B-D_1

Crow Creek (mainstem) from road crossing in Section 16, T20N, R20W to the Flathead River . . . . . B-D_2

Tributaries to Crow Creek from road crossing in Section 16 to the Flathead River . . . . . B-D_1

Little Bitterroot River drainage to Hubbart Reservoir . . . . . B-D_1

Little Bitterroot River (mainstem) from Hubbart Reservoir dam to the Flathead River . . . . . B-D_2

Tributaries to the Little Bitterroot River from Hubbart Reservoir to the Flathead River except Hot Springs Creek listed below . . . . . B-D_1

Hot Springs Creek drainage to the Hot Springs water supply intake . . . . . A-Closed

Hot Springs Creek (mainstem) from the Hot Springs water supply intake to the Little Bitterroot River . . . . E-F

Tributaries to Hot Springs Creek (if any) from the Hot Springs water supply intake to the Little Bitterrot River . B-D_1

Mission Creek drainage to the St. Ignatius water supply intake . A-Open-D_1

Mission Creek drainage from the St. Ignatius water supply intake to U. S. Highway No. 93 crossing about one mile west of St. Ignatius . . . . . B-D_1

Mission Creek (mainstem) from U. S. Highway No. 93 crossing to the Flathead River . . . . . B-D_2

Tributaries to Mission Creek from the U. S. Highway No. 93 crossing to the Flathead River . . . . . B-D_1

Kootenai River:

Kootenai River drainage from the border of Canada to the Idaho border (including the Yaak River) except the tributaries listed below . . . . . B-D_1

Deep Creek drainage (tributary to the Tobacco River) to the Fortine water supply intake . . . . . A-Open-D_1

Sullivan Creek drainage to the Rexford water supply intake . . . A-Closed

Rainy Creek drainage to the Zonolite Company water supply intake . . . . . A-Open-D_1

Rainy Creek (mainstem) from the Zonolite Company water supply intake to the Kootenai River . . . . . C-D_1

Flower Creek drainage to the Libby water supply intake . . . . . A-Open-D_1

MISSOURI BASIN

Missouri River Drainage

Missouri River:

Missouri River drainage to the Sun River in Great Falls except tributaries listed below . . . . . B-D_1

East Gallatin River (mainstem) (tributary to the Gallatin River, tributary to the Missouri River) from Montana Highway No. 293 crossing about one-half mile north of Bozeman to but excluding Dry Creek about five miles east of Manhattan . . . B-D_2

Remainder of East Gallatin River drainage except the tributaries listed below . . . . . B-D_1

Lyman and Sourdough (Bozeman) Creek drainages to the Bozeman water supply intake . . . . . A-Closed

Remainder of the Lyman and Sourdough Creek drainages . . . B-D_1

Hyalite Creek drainage to the Bozeman water supply intake . A-Open-D_1

Remainder of Hyalite Creek drainage . . . . . B-D_1

Big Hole River drainage (tributary to the Jefferson River, tributary to the Missouri River) above Divide . . . . . A-Open-D_1

Remainder of the Big Hole drainage . . . . . B-D_1

Rattlesnake Creek drainage (tributary to the Beaverhead River, tributary to the Jefferson River) to the Dillon water supply intake . . . . . A-Open-D_1

Remainder of Rattlesnake Creek drainage . . . . . B-D_1

Indian Creek drainage (tributary to the Ruby River, tributary to the Beaverhead River) to the Sheridan water supply intake . . A-Open-D_1

Remainder of Indian Creek drainage . . . . . B-D_1

Basin Creek drainage (tributary to the Boulder River, tributary to the Jefferson River) to the Basin water supply intake . . . . . A-Open-D_1

Remainder of Basin Creek drainage . . . . . B-D_1

Prickly Pear Creek drainage to the Montana Highway No. 433 crossing about one mile northwest of East Helena except the tributaries listed below . . . . . B-D_1

McClellan Creek drainage to the East Helena water supply intake . . . . . A-Open-D_1

Remainder of McClellan Creek drainage . . . . . B-D_1

Prickly Pear Creek (mainstem) from the Montana Highway No. 433 crossing about one mile northwest of East Helena to Lake Helena . . . . . E-F

Tributaries of Prickly Pear Creek from the Montana Highway No. 433 crossing to its mouth except those tributaries listed below . . . . . B-D_1

Ten Mile Creek drainage to the Helena water supply intake . A-Open-D_1

Remainder of Ten Mile Creek drainage . . . . . B-D_1

Willow Creek drainage (tributary of the Smith River, tributary to the Missouri River) to the White Sulphur Springs water supply intake . . . . . A-Closed

Remainder of the Willow Creek drainage . . . . . B-D_1

Missouri River (mainstem) from Sun River to Rainbow Dam . . . . B-D_2

Missouri River drainage from Rainbow Dam in Great Falls to the North Dakota state line except the portion of the mainstem and the tributaries listed below . . . . . B-D_3

Sun River drainage to but excluding Muddy Creek near Vaughn . . . . . B-D_1

Muddy Creek drainage . . . . . E-F

Sun River (mainstem) from Muddy Creek to the Missouri River . . . . . B-D_3

Tributaries (if any) to the Sun River from Muddy Creek to the Missouri River . . . . . B-D_1

Belt Creek drainage to and including Otter Creek except portion of O'Brien Creek listed below . . . . . B-D_1

O'Brien Creek drainage to the Neihart water supply intake . . . . . A-Open-D_1

Remainder of O'Brien Creek drainage . . . . . B-D_1

Belt Creek (mainstem) from Otter Creek to the Missouri River . . . . . B-D_2

Tributaries to Belt Creek from Otter Creek to the Missouri River . . . . . B-D_1

Highwood and Shonkin Creek drainages . . . . . B-D_1

Marias River drainage except the tributaries listed below . . . B-D2

Cutbank Creek drainage to but excluding Old Maid Miller Coulee in Cut Bank except the portion of Willow Creek listed below . . . . . B-D_1

Willow Creek drainage to the Montana Highway No. 464 crossing about one-half mile north of Browning . . . . B-D_1

Willow Creek (mainstem) from the Montana Highway No. 464 crossing to Cutbank Creek (also included in the Marias River drainage classification above) . . . . . B-D_2

Tributaries (if any) to Willow Creek from Montana Highway No. 464 crossing to Cutbank Creek . . . . . B-D_1

Cutbank Creek (mainstem) from Old Maid Miller Coulee to Birch Creek (also listed under Marias River drainage classification above) B-D2

Tributaries to Cutbank Creek from but excluding Old Maid Miller Coulee (which is B-D2) to Birch Creek B-D1

Birch Creek drainage except tributaries listed below . . . B-D2

Two Medicine Creek drainage to and including the Badger Creek drainage B-D1

Midvale Creek drainage to the East Glacier water supply intake . . . . . A-Closed

Remainder of Midvale Creek drainage B-D1

Summit Creek drainage to the Summit water supply intake . . . . . A-Closed

Remainder of Summit Creek drainage B-D1

Two Medicine Creek (mainstem) from Badger Creek to Birch Creek B-D2

Tributaries to Two Medicine Creek from Badger Creek to Cutbank Creek B-D1

Teton River drainage to and including Deep Creek near Choteau B-D1

Remainder of Teton River drainage B-D2

Eagle Creek drainage to but excluding Dog Creek B-D1

Remainder of Eagle Creek drainage B-D3

Judith River drainage to Big Spring Creek B-D1

Big Spring Creek drainage to the Mill Ditch headgate near the southern city limits of Lewistown B-D1

Big Spring Creek (mainstem) from the Mill Ditch headgate to the Judith River B-D2

Tributaries to Big Spring Creek from the Mill Ditch headgate to the Judith River B-D1

Judith River (mainstem) from Big Spring Creek to the Missouri River B-D2

Tributaries to the Judith River from Big Spring Creek to the Missouri River B-D1

Cow Creek drainage to but excluding Al's Creek B-D1

Remainder of Cow Creek drainage B-D3

Musselshell River drainage to and including Hopley Creek near Harlowton B-D1

Musselshell River drainage from Hopley Creek to but excluding Half Breed Creek near Roundup except American Fork listed below B-D2

American Fork drainage B-D1

Musselshell River drainage from and including Half Breed Creek to Fort Peck Reservoir except Flatwillow Creek drainage listed below B-D3

Flatwillow Creek drainage (may be the Box Elder Creek drainage) near Mosby B-D2

Missouri River (mainstem) from Fort Peck Dam to the Milk River B-D2

Milk River drainage from source (or from the Glacier National Park Boundary) to the International Boundary B-D1

Milk River drainage from the International Boundary to the Missouri River except the tributaries listed below B-D3

Big Sandy Creek drainage above Big Sandy B-D1

Remainder of Big Sandy Creek drainage B-D3

Beaver, Box Elder and Clear Creek drainages (all near Havre) B-D1

People's Creek drainage to and including the South Fork of People's Creek B-D1

Remainder of People's Creek drainage B-D3

Wolf Creek drainage near Wolf Point B-D2

Poplar River drainage B-D2

Yellowstone River:

Yellowstone River drainage from the Yellowstone Park Boundary to the Laurel water supply intake B-D1

Yellowstone River drainage from the Laurel water supply intake to the Billings water supply intake except the tributaries listed below B-D2

Clarks Fork Yellowstone River drainage from source to the Wyoming state line and from the Wyoming state line to and including Jack Creek near Bridger . . . . . B-D_1

Clarks Fork Yellowstone River (mainstem) from Jack Creek to the Yellowstone River . . . . . B-D_2

Tributaries to the Clarks Fork Yellowstone River from Jack Creek to the Yellowstone River except the West Fork of Rock Creek listed below . . . . . B-D_1

West Fork of Rock Creek drainage to the Red Lodge water supply intake . . . . . A-Open-D_1

Remainder of West Fork of Rock Creek drainage . . . . . B-D_1

Yellowstone River drainage from the Billings water supply intake to the North Dakota state line except the tributaries listed below . . . . . B-D_3

Pryor Creek drainage . . . . . B-D_1

Big Horn drainage above but excluding William's Coulee near Hardin . . . . . B-D_1

Big Horn drainage from and including William's Coulee to the Yellowstone River except the Little Big Horn listed below . . . . . B-D_2

Little Big Horn drainage above and including Lodgegrass Creek near Lodge Grass . . . . . B-D_1

Remainder of the Little Big Horn drainage . . . . . B-D_2

Tongue River (mainstem) from Tongue River Reservoir to but excluding Prairie Dog Coulee . . . . . B-D_2

Remainder of the Tongue River drainage . . . . . B-D_3

Fox Creek drainage near Sidney . . . . . B-D_2

Little Missouri and Belle Fourche drainages - all waters . . . . . B-D_3

Hudson Bay drainage:

All waters within Glacier National Park except the portion of Swiftcurrent Creek listed below . . . . . A-Open-D_1

Swiftcurrent Creek (mainstem) from the Many Glacier Chalet to Lake Sherbourne . . . . . B-D_1

All waters outside park from park boundary to the International Boundary . . . . . B-D_1 .

(5) Water-use description and specific water quality criteria.

(a) General. Specific water quality criteria, along with criteria in section (6) protect the beneficial water uses set forth in the water-use descriptions for the following classifications of water. Criteria for organisms of the coliform group are based on a minimum of five samples obtained during separate 24-hour periods during any consecutive 30-day period analyzed by the most probable number or equivalent membrane filter methods. The metal limits on the Clark Fork River [section (6)] are to govern when this section (5) imposes a conflicting requirement with that criteria.

(b) A-Closed classification.

(i) Water-use description. Water supply for drinking, culinary and food processing purposes suitable for use after simple disinfection. Public access and activities such as livestock grazing and timber harvest are to be controlled by the utility owner under conditions prescribed and orders issued by the department. Only those waters on which access is presently controlled by the utility owner have been classified as A-Closed. If other uses are permitted, the waters are to be reclassified A-Open-D_1.

(ii) Specific water quality criteria.

(aa) The average number of organisms in the coliform group is not to exceed 50 per 100 milliliters.

(ab) Dissolved oxygen criteria are not applicable for the classification.

(ac) No change from natural pH is allowed.

(ad) No increase above naturally occurring turbidity is allowed.

(ae) No increase above naturally occurring water temperature is allowed.

(af) No increases above naturally occurring concentrations of sediment, settleable solids or residues, which adversely affect the use indicated, are allowed.

(ag) No increases of toxic or other deleterious substances, pesticides and organic and inorganic materials including heavy metals, above naturally occurring concentrations, are allowed.

(ah) No wastes are allowed which increase radioactivity above natural background levels.

(c) A-Open-D_1 classification.

(i) Water-use description. Water supply for drinking, culinary and food processing purposes suitable for use after simple disinfection and removal of naturally present impurities. Water quality is to be maintained suitable for bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply. Where the waters are used for swimming or other water-contact sports, analyses are to be made by the utility owner and the department to determine if a higher degree of treatment is required for potable water use.

Waters, if shown to meet the A-Closed criteria, may be so classified by the department at the request of the utility owner. State waters within the boundaries of national parks and nationally designated wild, wilderness or primitive areas in the state are classified A-Open-D_1 except those adjacent to developed areas such as Snyder Creek through the community of Lake McDonald and Swiftcurrent Creek below the Many Glacier Chalet, both in Glacier National Park. Also, Georgetown, Flathead and Whitefish lakes and Lake Mary Ronan are classified A-Open-D_1 as are some streams presently used for domestic water supply.

(ii) Specific water quality criteria.

(aa) The average number of organisms in the coliform group is not to exceed 50 per 100 milliliters where demonstrated to be the result of domestic sewage.

(ab) Dissolved oxygen concentration is not to be reduced below 7.0 milligrams per liter.

(ac) Induced variation of hydrogen ion concentration (pH) within the range of 6.5 to 8.5 is to be less than 0.5 pH unit. Natural pH outside this range is to be maintained without change. Natural pH above 7.0 is to be maintained above 7.0.

(ad) No increase above naturally occurring turbidity is allowed.

(ae) A 1° F maximum increase above naturally occurring water temperature is allowed within the range of 32° F to 66° F; within the naturally occurring range of 66° F to 66.5° F, no discharge is allowed which will cause the water temperature to exceed 67° F; and where the naturally occurring water temperature is 66.5° F or greater, the maximum allowable increase in water temperature is 0.5° F. A 2° F per hour maximum decrease below naturally occurring water temperature is allowed when the water temperature is above 55° F, and a 2° F maximum decrease below naturally occurring water temperature is allowed within the range of 55° F to 32° F.

(af) No increases above naturally occurring concentrations of sediment, settleable solids or residues, which adversely affect the use indicated, are allowed.

(ag) Concentrations of toxic or other deleterious substances, pesticides and organic and inorganic materials including heavy metals, after treatment for domestic use, are not to exceed the recommended limits established in the 1962 U. S. Public Health Service Drinking Water Standards or subsequent editions; an increase of more than 10 percent of the concentration present in the receiving water is not allowed; maximum allowable concentrations are to be less than acute or chronic problem levels as revealed by bioassay or other methods.

(ah) True color is not to be increased more than two units above naturally occurring color.

(d) B-D1 classification.

(i) Water-use description. The quality is to be maintained suitable for drinking, culinary and food processing purposes after adequate treatment equal to coagulation, sedimentation, filtration, disinfection and any additional treatment necessary to remove naturally present impurities; bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.

(ii) Specific water quality criteria.

(aa) The average number of organisms in the fecal coliform group is not to exceed 200 per 100 milliliters, nor are 10 percent of the total samples during any 30-day period to exceed 400 fecal coliforms per 100 milliliters. The average number of organisms in the coliform group is not to exceed 1,000 per 100 milliliters, nor are 20 percent of the samples to exceed 1,000 coliforms per 100 milliliters during any 30-day period.

(ab) Dissolved oxygen concentration is not to be reduced below 7.0 milligrams per liter.

(ac) Induced variation of hydrogen ion concentration (pH) within the range of 6.5 to 8.5 is to be less than 0.5 pH unit. Natural pH outside this range is to be maintained without change. Natural pH above 7.0 is to be maintained above 7.0.

(ad) The maximum allowable increase above naturally occurring turbidity is 5 Jackson Candle Units except as is permitted in the general water quality criteria.

(ae) A 1° F maximum increase above naturally occurring water temperature is allowed within the range of 32° F to 66° F; within the naturally occurring range of 66° F to 66.5° F, no discharge is allowed which will cause the water temperature to exceed 67° F; and where the naturally occurring water temperature is 66.5° F or greater, the maximum allowable increase in water temperature is 0.5° F. A 2° F per hour maximum decrease below naturally occurring water temperature is allowed when the water temperature is above 55° F, and a 2° F maximum decrease below naturally occurring water temperature is allowed within the range of 55° F to 32° F.

This applies to all waters in the state classified B-D_1 except for Prickly Pear Creek from McClellan Creek to the Montana Highway No. 433 crossing where a 2° F maximum increase above naturally occurring water temperature is allowed within the range of 32° F to 65° F; within the naturally occurring range of 65° F to 66.5° F, no discharge is allowed which will cause the water temperature to exceed 67° F; and where the naturally occurring water temperature is 66.5° F or greater, the maximum allowable increase in water temperature is 0.5° F.

(af) No increases above naturally occurring concentrations of sediment, settleable solids or residues, which adversely affect the use indicated, are allowed.

(ag) Concentrations of toxic or other deleterious substances, pesticides and organic and inorganic materials including heavy metals, after treatment for domestic use, are not to exceed the recommended limits contained in the 1962 U. S. Public Health Service Drinking Water Standards or subsequent editions; also, maximum allowable concentrations are to be less than acute or chronic problem levels as revealed by bioassay or other methods.

(ah) True color is not to be increased more than five units above naturally occurring color.

(e) <u>B-D_2 classification</u>.

(i) Water-use description. The quality is to be maintained suitable for drinking, culinary and food processing purposes after adequate treatment equal to coagulation, sedimentation, filtration, disinfection and any additional treatment necessary to remove naturally present impurities; bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.

(ii) Specific water quality criteria.

(aa) The average number of organisms in the fecal coliform group is not to exceed 200 per 100 milliliters nor are 10 percent of the total samples during any 30-day period to exceed 400 fecal coliforms per 100 milliliters. The average number of organisms in the coliform group is not to exceed 1,000 per 100 milliliters nor are 20 percent of the samples to exceed 1,000 coliforms per 100 milliliters during any 30-day period.

(ab) Dissolved oxygen concentration is not to be reduced below 7.0 milligrams per liter from October 1 through June 1 nor below 6.0 milligrams per liter from June 2 through September 30.

(ac) Induced variation of hydrogen ion concentration (pH) within the range of 6.5 to 9.0 is to be less than 0.5 pH unit. Natural pH outside this range is to be maintained without change. Natural pH above 7.0 is to be maintained above 7.0.

(ad) The maximum allowable increase above naturally occurring turbidity is 10 Jackson Candle Units, except as is permitted in the general water quality criteria.

(ae) A 1° F maximum increase above naturally occurring water temperature is allowed within the range of 32° F to 66° F; within the naturally occurring range of 66° F to 66.5° F, no discharge is allowed which will cause the water temperature to exceed 67° F; and where the naturally occurring water temperature is 66.5° F or greater, the maximum allowable increase in water temperature is 0.5° F. A 2° F per hour maximum decrease below naturally occurring water temperature is allowed when the water temperature is above 55° F, and a 2° F maximum decrease below naturally occurring water temperature is allowed within the range of 55° F to 32° F.

(af) No increases above naturally occurring concentrations of sediment, settleable solids or residues, which adversely affect the use indicated, are allowed.

(ag) Concentrations of toxic or other deleterious substances, pesticides and organic and inorganic materials including heavy metals, after treatment for domestic use, are not to exceed the recommended limits contained in the 1962 U. S. Public Health Service Drinking Water Standards or subsequent editions; also, maximum allowable concentrations are to be less than acute or chronic problem levels as revealed by bioassay or other methods.

(ah) True color is not to be increased more than five units above naturally occurring color.

(f) <u>B-D3 classification</u>.

(i) Water-use description. The quality is to be maintained suitable for drinking, culinary and food processing purposes after adequate treatment equal to coagulation, sedimentation, filtration, disinfection and any additional treatment necessary to remove naturally present impurities; bathing, swimming and recreation; growth and propagation of non-salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.

(ii) Specific water quality criteria.

(aa) The average number of organisms in the fecal coliform group is not to exceed 200 per 100 milliliters nor are 10 percent of the total samples during any 30-day period to exceed 400 fecal coliforms per 100 milliliters. The average number of organisms in the coliform group is not to exceed 1,000 per 100 milliliters nor are 20 percent of the samples to exceed 1,000 coliforms per 100 milliliters during any 30-day period.

(ab) Dissolved oxygen concentration is not to be reduced below 5.0 milligrams per liter.

(ac) Induced variation of hydrogen ion concentration (pH) within the range of 6.5 to 9.0 is to be less than 0.5 pH unit. Natural pH outside this range is to be maintained without change. Natural pH above 7.0 shall be maintained above 7.0.

(ad) The maximum allowable increase above naturally occurring turbidity is 10 Jackson Candle Units, except as is permitted in the general water quality criteria.

(ae) A 3° F maximum increase above naturally occurring water temperature is allowed within the range of 32° F to 77° F; within the naturally occurring range of 77° F to 79.5° F, no thermal discharge is allowed which will cause the water temperature to exceed 80° F; and where the naturally occurring water temperature is 79.5° F or greater, the maximum allowable increase in water temperature is 0.5° F. A 2° F per hour maximum decrease below naturally occurring water temperature is allowed when the water temperature is above 55° F, and a 2° F maximum decrease below naturally occurring water temperature is allowed within the range of 55° F to 32° F.

This applies to all waters in the state classified B-D3, except from the Billings water supply intake to the water diversion at Intake, a 3° F maximum increase above naturally occurring water temperature is allowed within the range of 32° F to 79° F; within the range of 79° F to 81.5° F, no thermal discharge is allowed which will cause the water temperature to exceed 82° F; and where the naturally occurring water temperature is 81.5° F or greater, the maximum allowable increase in water temperature is 0.5° F.

From the water diversion at Intake to the North Dakota state line, a 3° F maximum increase above naturally occurring water temperature is allowed within the range of 32° F to 82° F; within the range of 82° F to 84.5° F, no thermal discharge is allowed which will cause the water temperature to exceed 85° F; and where the naturally occurring water temperature is 84.5° F or greater, the maximum allowable increase in water temperature is 0.5° F.

(af) No increases above naturally occurring concentrations of sediment, settleable solids or residues, which adversely affect the use indicated, are allowed.

(ag) Concentrations of toxic or other deleterious substances, pesticides and organic and inorganic materials including heavy metals, after treatment for domestic use, are not to exceed the recommended limits contained in the 1962 U. S. Public Health Service Drinking Water Standards or subsequent editions; also, maximum allowable concentrations are to be less than acute or chronic problem levels as revealed by bioassay or other methods.

(ah) True color is not to be increased more than five units above naturally occurring color.

(g) C-D_1 classification.

(i) Water-use description. The quality is to be maintained suitable for bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers, and agricultural and industrial water supply.

(ii) Specific water quality criteria.

(aa) The average number of organisms in the fecal coliform group is not to exceed 200 per 100 milliliters nor are 10 percent of the total samples during any 30-day period to exceed 400 fecal coliforms per 100 milliliters. The average number of organisms in the coliform group is not to exceed 1,000 per 100 milliliters nor are 20 percent of the samples to exceed 1,000 coliforms per 100 milliliters during any 30-day period.

(ab) Dissolved oxygen concentration is not to be reduced below 7.0 milligrams per liter.

(ac) Induced variation of hydrogen ion concentration (pH) within the range of 6.5 to 8.5 is to be less than 0.5 pH unit. Natural pH outside this range is to be maintained without change. Natural pH above 7.0 is to be maintained above 7.0.

(ad) The maximum allowable increase above naturally occurring turbidity is 5 Jackson Candle Units, except as is permitted in the general water quality criteria.

(ae) A 1° F maximum increase above naturally occurring water temperature is allowed within the range of 32° F to 66° F; within the naturally occurring range of 66° F to 66.5° F, no discharge is allowed which will cause the water temperature to exceed 67° F; and where the naturally occurring water temperature is 66.5° F or greater, the maximum allowable increase in water temperature is 0.5° F. A 2° F per hour maximum decrease below naturally occurring water temperature is allowed when the water temperature is above 55° F, and a 2° F maximum decrease below naturally occurring water temperature is allowed within the range of 55° F to 32° F.

(af) No increases above naturally occurring concentrations of sediment, settleable solids or residues, which adversely affect the use indicated, are allowed.

(ag) Concentrations of toxic or other deleterious substances, pesticides and organic and inorganic materials including heavy metals, are not to exceed levels known or demonstrated to be of public health significance; also maximum allowable concentrations are to be less than acute or chronic problem levels as revealed by bioassay or other methods.

(ah) True color is not to be increased more than five units above naturally occurring color.

(h) C-D2 classification.

(i) Water-use description. The quality is to be maintained for bathing, swimming and recreation; growth and marginal propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.

(ii) Specific water quality criteria.

(aa) The average number of organisms in the fecal coliform group is not to exceed 200 per 100 milliliters nor are 10 percent of the total samples during any 30-day period to exceed 400 fecal coliforms per 100 milliliters. The average number of organisms in the coliform group is not to exceed 1,000 per 100 milliliters nor are 20 percent of the samples to exceed 1,000 coliforms per 100 milliliters during any 30-day period.

(ab) Dissolved oxygen concentration is not to be reduced below 7.0 milligrams per liter from October 1 through June 1 nor below 6.0 milligrams per liter from June 2 through September 30.

(ac) Induced variation of hydrogen ion concentration (pH) within the range of 6.5 to 9.0 is to be less than 0.5 pH unit. Natural pH outside this range is to be maintained without change. Natural pH above 7.0 is to be maintained above 7.0.

(ad) The maximum allowable increase above naturally occurring turbidity is 10 Jackson Candle Units, except as is permitted in the general water quality criteria.

(ae) A 1° F maximum increase above naturally occurring water temperature is allowed within the range of 32° F to 66° F; within the naturally occurring range of 66° F to 66.5° F, no discharge is allowed which will cause the water temperature to exceed 67° F; and where the naturally occurring water temperature is 66.5° F or greater, the maximum allowable increase in water temperature is 0.5° F. A 2° F per hour maximum decrease below naturally occurring water temperature is allowed when the water temperature is above 55° F, and a 2° F maximum decrease below naturally occurring water temperature is allowed within the range of 55° F to 32° F.

(af) No increases above naturally occurring concentrations of sediment, settleable solids or residues, which adversely affect the use indicated, are allowed.

(ag) Concentrations of toxic or other deleterious substances, pesticides and organic and inorganic materials including heavy metals, are not to exceed levels known or demonstrated to be of public health significance; also maximum allowable concentrations are to be less than acute or chronic problem levels as revealed by bioassay or other methods.

(ah) True color is not to be increased more than five units above naturally occurring color.

(d) E-F classification.

(i) Water-use description. The quality is to be maintained for agricultural and industrial water uses other than food processing.

(ii) Specific water quality criteria.

(aa) The average number of organisms in the fecal coliform group is not to exceed 200 per 100 milliliters nor are 10 percent of the total samples during any 30-day period to exceed 400 fecal coliforms per 100 milliliters. The average number of organisms in the coliform group is not to exceed 1,000 per 100 milliliters nor are 20 percent of the samples to exceed 1,000 coliforms per 100 milliliters during any 30-day period.

(ab) Dissolved oxygen concentration is not to be reduced below 3 milligrams per liter.

(ac) Induced variation of hydrogen ion concentration (pH) within the range of 6.5 to 9.5 is to be less than 0.5 pH unit. Natural pH outside this range is to be maintained without change. Natural pH above 7.0 is to be maintained above 7.0.

(ad) Naturally occurring turbidity, naturally occurring water temperatures and naturally occurring concentrations of sediments, settleable solids or residues are not to be increased in quantity or amounts which adversely affect the use indicated.

(ae) Concentrations of toxic or deleterious substances, pesticides and organic and inorganic materials including heavy metals, are to be less than those demonstrated to be deleterious to livestock or plants or their subsequent consumption by humans or to adversely affect other indicated uses.

(6) General water quality criteria.

(a) The degree of waste treatment required to restore and maintain the standards is to be determined by the department and is to be based on the following.

(i) The state's policy of nondegradation of existing high water quality as described in Section 69-4808.2, R.C.M. 1947.

(ii) Present and anticipated beneficial uses of the receiving water.

(iii) The quality and nature of flow of the receiving water.

(iv) The quantity and quality of the sewage, industrial waste or other waste to be treated.

(v) The presence or absence of other sources of pollution on the same watershed.

(b) Sewage is to receive a minimum of secondary treatment as defined by EPA in accordance with requirements as set forth in the Federal Water Pollution Control Act Amendments of 1972.

(c) Industrial waste is to receive, as a minimum, treatment equivalent to the best practicable control technology currently available (BPCT) as defined by EPA. In cases where BPCT is not defined by EPA, industrial waste is to receive, after maximum practicable in-plant control, a minimum of secondary treatment or equivalent.

(d) For design of disposal systems, stream flow dilution requirements are to be based on minimum consecutive seven-day average flow which may be

expected to occur on the average of once in ten years. When dilution flows are less than the above design flow at a point discharge, the discharge is to be governed by the permit conditions developed for the discharge through the waste discharge permit program.

(e) State surface waters are to be free from substances attributable to municipal, industrial, agricultural practices or other discharges that will:

(i) Settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines.

(ii) Create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter) or globules of grease or other floating materials.

(iii) Produce odors, colors or other conditions as to create a nuisance or render undesirable tastes to fish flesh or make fish inedible.

(iv) Create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life.

(v) Create conditions which produce undesirable aquatic life.

(f) No wastes are to be discharged and no activities conducted such that the wastes or activities, either alone or in combination with other wastes or activities, will violate, or can reasonably be expected to violate, any of the standards; (e.g., in a reach of stream classified B-D_1, the total allowable cumulative increase to naturally occurring turbidity conditions in the reach is 5 Jackson Candle Units).

(g) No wastes are to be discharged and no activities conducted which, either alone or in combination with other wastes or activities, will cause turbidities to exceed those allowed by specific water quality criteria; provided, short-term activities necessary to accommodate essential dredging, channel or bank alterations, stream diversions or other construction where turbidities in excess of the criteria are unavoidable, may be authorized by the department under conditions as it may prescribe.

(h) Methods of sample collection, preservation and analysis used to determine compliance with the standards are to be in accordance with the latest edition of Standard Methods for the Examination of Water and Wastewater published by the American Public Health Association or in accordance with tests or procedures that have been found to be equally or more applicable.

(i) For operations of existing water impoundments that cause conditions harmful to prescribed beneficial uses of state waters, it is to be

demonstrated to the satisfaction of the department that continued operations will be done in the best practicable manner to minimize harmful effects and will not violate state laws or department rules. New water impoundments shall be designed to provide temperature variations in discharging water that maintain or enhance the existing propagating fishery and associated aquatic life. As a guide, the following temperature variations are recommended: Continuously less than 40° F during the months of January and February, and continuously greater than 44° F during the months of June through September.

(j) Ponds for waste treatment purposes are not to be located in drainage ways where the volume of drainage water from a 10-year storm entering the ponds exceeds one-half the volume of the pond; provided that, subject to approval by the department as to design and maintenance, ponds located in drainage ways for the express purpose of containing emergency oil spills are permitted.

(k) Dumping of snow from municipal and/or parking lot snow removal activities into waters of the state is prohibited without a permit from the department.

(l) Existing discharges to state waters will be entitled a mixing zone as determined by the department.

(m) Until such time as minimum stream flows are established for dewatered streams, the minimum treatment requirements for discharges to dewatered receiving streams are to be no less than the minimum treatment requirements prescribed.

(n) Treatment requirements for discharges to intermittent streams are to be no less than the minimum treatment requirements prescribed.

(o) Pollution resulting from storm drainage, storm sewer discharges, and non-point sources, including irrigation practices, road building, construction, logging practices, overgrazing and other practices, are to be eliminated or minimized as ordered by the department.

(p) Application of pesticides in or adjacent to state waters is to be in compliance with the labeled direction, and in accordance with provisions of the Montana Pesticides Act (Title 27, Chapter 2, R.C.M. 1947) and the Federal Environmental Pesticides Control Act (Public Law 92-516). Excess pesticides and pesticide containers are not to be disposed of in a manner or in a location where they are likely to pollute state waters.

(q) The following radiological criteria shall apply to all waters except those classified as A-Closed:

(i) The average dissolved concentrations (including the naturally occurring or background contribution) of iodine 131, radium-226, strontium-89, strontium-90 and tritium are not to exceed the following concentration limits:

Iodine-131	5 pCi/L
Radium-226	1 pCi/L
Strontium-89	100 pCi/L
Strontium-90	10 pCi/L
Tritium	3,000 pCi/L

For all other radionuclides, the average dissolved concentration limits are to be 1/150 of the corresponding maximum permissible concentration in water for continuous occupational exposure as recommended by the National Committee on Radiation Protection (National Bureau of Standards Handbook 69 or subsequent revisions.)

(ii) For a mixture of radionuclides, the following relationship is to be satisfied:

$$\frac{C_1}{L_1} + \frac{C_2}{L_2} \ldots + \frac{C_n}{L_n} \leq 1.00$$

C denotes the average concentration of the respective radionuclide, and L denotes its concentration limit.

(iii) Where alpha emitters, strontium-90, radium-228, iodine-129, iodine-130 and lead-210 are known to be absent, routine analyses for dissolved gross beta radioactivity (excluding potassium-40 contribution) may be employed to monitor and show compliance with this criterion (except for tritium) as long as the gross concentration does not exceed 100 pCi/L. When these conditions are not met, routine quantitative analyses of individual radionuclides are to be performed to show compliance. Except in cases where tritium from other than natural sources is known to be absent, routine tritium analyses are to be performed to show compliance. (Note: "Absence" means a negligibly small fraction of the specific concentration limit, where the limit for unidentified alpha emitters is taken as the limit for radium-226.)

(iv) For radionuclides associated with suspended material in transport, the average concentration limits are to be 1/150 of the corresponding maximum permissible concentration in water (insoluble form) for continuous occupational exposure as recommended by the National Committee on Radiation Protection. In-stream sedimentation of these materials is not to produce solids beds that are not in compliance with subsections (q) (i) and (q) (ii) (because of leaching) and/or excessive accumulation in native flora and fauna.

(v) Average concentrations are to be computed from monitoring data acquired during the previous 12 months; maximum concentrations are not to exceed three times the average concentration limits specified.

(vi) Variances from concentration limits specified will be permitted only if the contributing source is non-controllable or a natural source. Best available treatment must be provided for man-made discharges, and the exposure received by affected population groups must be within established dose limits.

(r) No wastes are to be discharged and no activities conducted which, either alone or in combination with other wastes or activities, will result in the dissolved gas content relative to the water surface to exceed 110 percent of saturation.

(s) Bioassay median tolerance concentrations are to be based on latest available research results for the materials, by bioassay tests procedures for simulating actual stream conditions as set forth in the latest edition of Standard Methods for the Examination of Water and Wastewater published by the American Public Health Association, or in accordance with tests or analytical procedures that have been found to be equal or more applicable by EPA. Bioassay studies are to be made using the most sensitive local species and life stages of economic or ecological importance; provided other species whose relative sensitivity is known may be used when there is difficulty in providing the most sensitive species in sufficient numbers.

When specific application factors are not available, the factor is to be determined by using methods listed in Water Quality Criteria published by the Federal Water Pollution Control Administration (1968), or by using other methods accepted as equal or applicable by EPA.

(t) Metal limits for the Clark Fork River (mainstem) from the confluence of Warm Springs Creek to the confluence with Cottonwood Creek are:

Material	Average Daily Concentration ug/l	Maximum Instantaneous Concentration ug/l
Total copper	90	180
Dissolved copper	30	40
Total zinc	300	1,000
Dissolved zinc	80	140
Total iron	1,300	2,200
Dissolved iron	150	160
Total lead	100	100
Dissolved lead	100	100
Total cadmium	10	10
Total arsenic	10	16
Total mercury	1	1

Metal limits for Clark Fork River (mainstem) from the confluence of Cottonwood Creek to the Idaho state line are:

Material	Average Daily Concentration ug/l	Maximum Instantaneous Concentration ug/l
Total copper	50	90
Dissolved copper	30	30
Total zinc	100	200
Dissolved zinc	70	80
Total iron	300	1,300
Dissolved iron	150	150
Total lead	50	50
Dissolved lead	50	50
Total cadmium	10	10
Total arsenic	10	10
Total mercury	1	1

(History: Sec. 69-4814, R.C.M. 1947; IMP Sec. 69-4808.2(1)(b), R.C.M. 1947; Order MAC No. 16-1; Adp. 12/31/72; Eff. 12/31/72; AMD, MAC Notice No. 16-2-3, Order MAC No. 16-2-5; Adp. 7/13/73; Eff. 11/4/73; PRIOR p. 16-375; AMD, MAC Notice No. 16-2-31; Order MAC No. 16-2-11; Adp. 7/19/74; Eff. 9/5/74; PRIOR p. 16-387, 391, 393, 393.1, 393.4.).

APPENDIX III

Minutes of Public Hearing

MINUTES OF PUBLIC HEARING
FOR
KOOTENAI RIVER BASIN
WATER QUALITY MANAGEMENT PLAN

Date: April 30, 1974

Time: 7:30 pm

Place: Lincoln County Courthouse, Libby, Montana

Sponsor: Montana State Department of Health & Environmental Sciences

Hearing Officer: Wilbur O. Aikin, Public Health Engineer, State Department of Health and Environmental Sciences

Public Notice: Copy of public notice attached. Advertised according to public notice requirements, in Western News of Libby, and the Tobacco Valley News of Eureka. In addition, 18 copies of the plan were distributed to official agencies, one was posted in the Lincoln County Courthouse for two weeks preceeding the meeting, and six copies were distributed at the public meeting.

Attendance at Public Meeting: The following persons signed the attendance roster at the public meeting:

Bob Arnold, Division of Forestry, Missoula
Jack Parrish, Mayor of Rexford
Melvin Syth, Libby
William Hafferman, Libby
Paul Verdon, The Western News, Libby
Bob Hafferman, Koocanusa Marina, Libby
Bill Shelley, S.C.S., Eureka
R. F. Burdick, St. Regis Co., Libby
Bruce May, Montana Fish & Game Dept., Libby
Terrance Schultz, Lincoln County Sanitarian, Libby
Ronald Bush, Corps of Engineers, Seattle
Thomas Bonde, Corps of Engineers, Libby
David Nunnallee, Montana State Dept. of Health & Environmental Sciences, Kalispell
Wilbur O. Aikin, Montana State Dept. of Health & Environmental Sciences, Kalispell

Description of Public Meeting

The meeting was opened by hearing officer Wilbur Aikin who described the enabling legislation and legal requirements for water quality management plans. David Nunnallee of the State Health Dept. presented the basic format of the plan, the water quality sampling network which was used, and a discussion of the water quality problems which were addressed in the plan. Other portions of the plan were discussed, and the meeting was opened to public comments. In addition to several questions about the format or content of the plan, the following recommendations were made:

(1) Mr. Robert Burdick, St. Regis Co., recommended that pages 17 and 18 be modified to show that his Company is now disinfecting its wastewater discharge all year, instead of partime as indicated in the plan.

(2) Mr. Ron Bush, Corps of Engineers, suggested that the following statement on page 35 was inaccurate: "...the Corps of Engineers would... install air injectors in the proposed turbines to reduce cavitation, and if this is done, air supersaturation below Libby Dam would probably continue to be a major problem." Mr. Bush indicated that air injectors to reduce cavitation are used only when turbines are being started up or shut down, and that the resulting air supersaturation would be very minor. He requested that this paragraph be changed accordingly.

(3) Several questions about "Table 9, Water Quality Summary," on pages 32 and 33 indicated confusion as to the nature of the data, whether it represented grab samples or long-term average data. The concensus was that the table should be re-titled to make this clear.

As no other formal comments or suggestions were forthcoming, the public meeting was adjourned.

BEFORE THE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

NOTICE OF PUBLIC HEARING

for receiving comment on state water quality management plan as it concerns the Kootenai Basin

1. On April 30, 1974, at 7:30 p.m., a public hearing will be held in the courtroom of the Lincoln County Courthouse, Libby, Montana, to receive public comment on the state water quality management plan as it affects the Kootenai. The water quality management plan is a part of the state water quality management plan which will become effective for the state of Montana under MAC 16-2.14(10)-S14480.

2. A summary of the water quality management plan follows. A complete copy of the proposed plan is available for inspection and copying at a reasonable fee at the Water Quality Bureau, Department of Health and Environmental Sciences, Cogswell Building, Helena, Montana 59601, or a copy may be inspected at the bulletin board located in the Lincoln County Courthouse at Libby, Montana.

This water quality management plan presents information relative to water quality and water quality management in the Kootenai basin. The objectives of this effort are to provide the state with water quality data and related information to (1) determine the water characteristics of all natural and waste waters, (2) determine what factors, both natural and manmade, affect the quality of the water, and (3) develop a management strategy for maintaining and enhancing the quality of waters in the basin. The scope of the plan will include (1) a description of the water and water-related resources of the basin, (2) a description and characteristics of all point and non-point sources of pollution and the quality of natural waters in the basin, and (3) information needed to determine whether Montana's water quality standards are and will continue to be met.

3. Interested persons may present information, views, or arguments, whether orally or in writing, at the hearing. Important or detailed testimony should be offered for the record in writing.

4. Mr. Wilbur Aikin, Kalispell, Montana, has been designated by the Director of the Department to preside over and conduct the hearing.

5. The authority of the Department to conduct said hearing is based on Section 69-4814, R. C. M. 1947.

/s/ John S. Anderson, M. D.

JOHN S. ANDERSON, M. D., Director
Department of Health & Environmental Sciences

PLATE I

MAP OF THE KOOTENAI RIVER BASIN